LAND ECONOMICS

a quarterly journal of

PLANNING, HOUSING & PUBLIC UTILITIES

Special Events Section: Milestones Marking the Completion of Thirty Years of Continuous Publication and the Hundredth Anniversary of the Birthday of Its Founder, Richard T. Ely.

"WHATEVER MAY BE THE LIMITATIONS WHICH TRAMMEL INQUIRY ELSEWHERE WE BELIEVE THE GREAT STATE UNIVERSITY OF WISCONSIN SHOULD EVER ENCOURAGE THAT CONTINUAL AND FEARLESS SIFTING AND WINNOWING BY WHICH ALONE THE TRUTH CAN BE FOUND."

From Report of Board of Regents, University of Wisconsin, 1894

VOLUME XXX, NUMBER 4 NOVEMBER 1954 PRICE $2.00 A COPY

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PUBLISHED QUARTERLY BY THE UNIVERSITY OF WISCONSIN
DURING THE MONTHS OF FEBRUARY, MAY, AUGUST, AND NOVEMBER

Publication Office: 121 South Pinckney Street, Madison, Wisconsin
Editorial Office: Sterling Hall, University of Wisconsin, Madison 6, Wisconsin
The contents of the *Journal* are indexed in the *Industrial Arts Index.*

Information on *Preparation and Submission of Manuscripts* available on application to Editorial Office.

Entered as second-class matter, January 3, 1938, at the post-office at Madison, Wis., under the Act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in section 1103, Act of October 3, 1917, authorized October 12, 1922. Printed in the United States of America.

Subscription Rates: $6 a year; $2.00 a copy. (Single copies 1 year or more old; $2.25.) Remittances may be made by personal checks, drafts, post-office or express money orders payable to *Land Economics.*

Agents of the *Journal* in Great Britain, B. F. Stevens & Brown Ltd., 28-30 Little Russell St. British Museum, London, W. C. 1.

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The St. Lawrence Seaway and Power Project

By MARTIN G. GLAESER*

THE oldest utility project of regional importance in the western hemisphere concerns the waterway by which the Great Lakes drain into the sea. This greatest of all inland waterways extends from the Strait of Belle Isle into the heartland of the continent. It is of both regional and national significance. The fourteen-states tributary to this waterway comprises an area stretching west from Ohio to Montana and Wyoming, south as far as Missouri and Kansas and north to the Canadian border. It is richly endowed with agricultural wealth, constituting the most productive food producing region of the world. In mineral wealth the area contains the largest coal and iron deposits and extensive potential energy resources in forests, gas, oil, oil shale and hydraulic power. Combined with these natural resources are the human resources of an industrial and farm work force, trained, experienced and skilled to the manifold tasks of industrial and agricultural production. Similar though less developed resources are tributary to this waterway from the Canadian side.

History of the Waterway

First utilized by fur traders, the initial improvement of this natural waterway dates back to 1795 when, in order to get their cargoes of furs around the rapids without portaging, a fur trading company constructed wooden locks at Sault Ste. Marie. (See accompanying map.) Another barrier to commerce was overcome in 1829 when the first Welland Canal was built by private interests to bypass Niagara Falls. It was equipped with forty wooden locks. Successive improvements by the Canadian government of the canal in 1845 and 1887 provided a channel with 14 foot locks in order to handle a growing traffic which by 1914 had increased to 3,860,000 tons. At this time there was no ocean traffic. River channel dredging, the construction of more locks at the Sault, and harbor improvements made the Great Lakes-St Lawrence system into an interior waterway 2300 miles in length. Early in the present century it boasted a minimum 14-foot navigation all the way from tidewater to Duluth.

In 1932 Canada completed a significant new improvement of the Welland Canal to 27 feet with locks to a depth of 30 feet over the sills. When in 1943 the United States finished the installation of the MacArthur locks at Sault Ste. Marie with a depth of 31 feet over the sills, the foundation had been laid which

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really started the agitation for a seaway for large ocean-going craft. The remaining obstacles in the upper waterway from Duluth to Lake Erie it was felt could be overcome by dredging to seaway specifications of 27 feet in the Detroit River, in Lake St. Clair and in the St. Clair River. For the most part the Great Lakes provided a natural deep water channel except where connecting channels in the Straits of Mackinac and the St. Marys River require deepening. (For general orientation as to the entire seaway, see the map.)

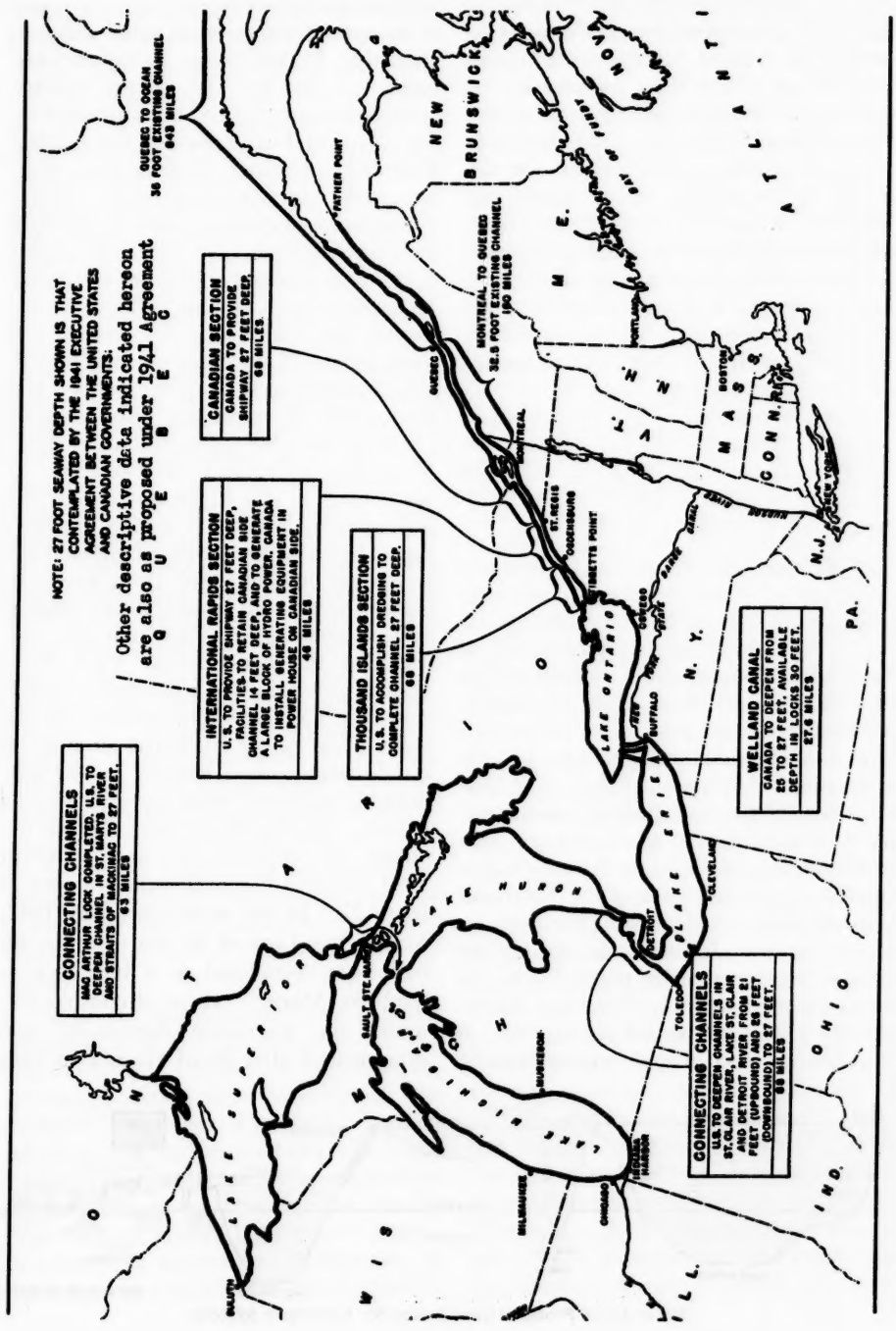
The most formidable obstacles are in the 160 miles between Lake Ontario and the deep-sea harbor of Montreal now passable only to vessels through shallow 14-foot canals built by Canada around rapids. These obstacles are in the International Rapids section where they are of joint concern to both the United States and Canada, in the Lake St. Francis, Soulanges and Lachine sections which concern only Canada. The profile of the entire seaway and the plans for the navigation and power improvements are shown in the map and chart both of which are self-explanatory.

Political Background of the Seaway and Power Project

The earliest planning and agitation for the present seaway and power project began in 1895 with an inquiry and first report upon the prospect of a "deep waterway." A basic step was taken when in 1909 the United States and Canada signed an International Boundary Treaty which created an International Joint Commission as administrative agent of the two governments. This body issued several reports on needed improvements, all of them favorable to the eventual consummation of a seaway plan. In 1923 the power phase became important when the American Superpower Corporation applied to the recently created Federal Power Commission for a license to develop some of the power in the international rapids section, but the application was turned down because deemed to be in conflict with the seaway aspects. Henceforth the dual purposes of navigation and power appeared to be indissolubly joined. On the technical side the Corps of Army Engineers became the United States agency which was usually called upon to supply engineering plans which by 1926 had settled down to recommend the single-stage development now being utilized.

Up to this time Canada showed much less interest in this dual purpose project than was exhibited on the American side because the Province of Ontario was surfeited with hydroelectric power as a result of the operations of its Hydroelectric Power Commission. In the United States, interest in the project was running high, especially in New York where Governor Franklin Roosevelt in 1931 had set up a State Power Authority, first of its kind, to serve as the promotional and action agency. Meanwhile Canada had rebuilt the Welland Canal, opening it to traffic in 1932 with its 30-foot locks.

The Treaty Phase. In 1932 the Joint Board of Engineers issued its final report which became the basis for a proposed new treaty between the United States and Canada. It was signed in Washington on July 18, 1932. The following year the New York State Power Authority and the U. S. Army Engineers reached an accord on plans for power development, on the disposition of the U. S. share of power and on cost reimbursement. Hearings on the treaty were conducted by the Senate Committee on Foreign Relations, which voted 15 to 5 to recommend approval of the treaty including the accord on power. In addition to the usual opposition from the railroads, the Atlantic and Gulf ports and the coal mining interests,


NOTE: 27 FOOT SEAWAY DEPTH SHOWN IS THAT CONTEMPLATED BY THE 1941 EXECUTIVE AGREEMENT BETWEEN THE UNITED STATES AND CANADIAN GOVERNMENTS.
Other descriptive data indicated hereon are also as proposed under 1941 Agreement
QUEBEC TO OCEAN 30 FOOT EXISTING CHANNEL 640 MILES
CANADIAN SECTION
CANADA TO PROVIDE SHIPWAY 27 FEET DEEP. 68 MILES
INTERNATIONAL RAPIDS SECTION
U. S. TO PROVIDE SHIPWAY 27 FEET DEEP, FACILITIES TO RETAIN CANADIAN SIDE CHANNEL 14 FEET DEEP, AND TO GENERATE A LARGE BLOCK OF HYDRO POWER. CANADA TO INSTALL GENERATING EQUIPMENT IN POWER HOUSE ON CANADIAN SIDE. 46 MILES
THOUSAND ISLANDS SECTION
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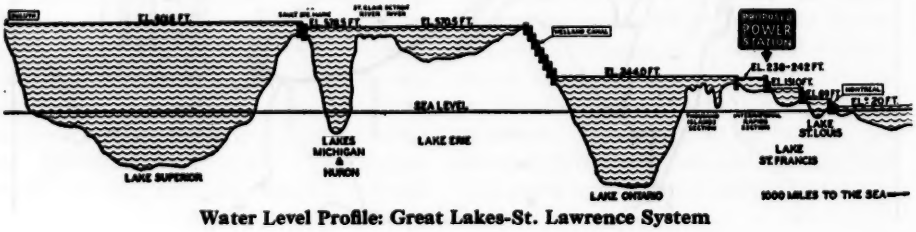
CONNECTING CHANNELS
SAULT STE. MARIE CANAL COMPLETED. U.S. TO DEEPEN CHANNEL IN ST. MARYS RIVER AND STRAITS OF MACKINAC TO 27 FEET. 63 MILES
WELLAND CANAL
CANADA TO DEEPEN FROM 25 TO 27 FEET. AVAILABLE DEPTH IN LOCKS 30 FEET. 27.6 MILES
CONNECTING CHANNELS
U.S. TO DEEPEN CHANNELS IN ST. CLAIR RIVER, LAKE ST. CLAIR AND DETROIT RIVER FROM 21 FEET (UPBOUND) AND 25 FEET (DOWNBOUND) TO 27 FEET. 68 MILES
MONTREAL TO QUEBEC 30.5 FOOT EXISTING CHANNEL 160 MILES
NEW BRUNSWICK
MAINE
ATLANTIC
MASS.
CONN. R.
N.J.
PA.
N. Y.
OHIO
IND.
ILL.
WIS.
MICH.
LAKE ONTARIO
LAKE ERIE
LAKE HURON
LAKE MICHIGAN
LAKE SUPERIOR
QUEBEC
MONTREAL
FATHER POINT
ST. REGIS
CORNWALL
MASSENA
BUFFALO
CLEVELAND
DETROIT
TOLEDO
SAULT STE. MARIE
MACKINAC
MILWAUKEE
CHICAGO
DULUTH

there was also opposition in Congress to making the accord a part of the treaty. The House favored the proposition of turning power development over to the State of New York, while the Senate was opposed. To smooth the way for the treaty in the Senate, the ever-versatile Franklin Roosevelt created an Interdepartmental Board (consisting of representatives of the Departments of War and Commerce, the Federal Power Commission and the New York Power Authority) to report on the Treaty. In a special message submitting the favorable report President Roosevelt urged Senate ratification. After prolonged debate the Treaty was defeated by a roll call vote of 46 to 42, thus lacking the necessary two-thirds majority.

The Executive Agreement Phase. Between 1934 and 1940 the legislative stalemate continued. Reports and surveys by various planning agencies continued to be made, all favoring the project except the Niagara Frontier Planning Board, which represented private power interests and which opposed construction. In 1936 discussion of a new treaty to include Niagara Falls redevelopment was started. At this time the national defense issue was injected by President Roosevelt in a speech at the dedication of the Thousand Islands Bridge. Meanwhile the need for power in both Canada and the United States developed in response to the renewed war emergency. President Roosevelt in a message urged construction at the International Rapids section because of its special value to national defense, allocating $1,000,000 of special defense funds for the purpose of preliminary engineering surveys and investigations by the Corps of Engineers and the Federal Power Commission. Canada made similar and corresponding preparations. These renewed mutual efforts finally bore fruit on March 19, 1941, when the United States and Canada signed an Executive Agreement at Ottawa, subject to approval by concurrent legislation. It provided for immediate construction in the International Rapids section and completion of navigation improvements elsewhere by 1948. The executive agreement was submitted to Congress for approval. It should be noted that the objective (international section improvement) had become a limited one and the procedure had changed from treaty to legislation by both houses, thus requiring only a bare majority. The new plan also included the Federal-New York State accord providing for a joint cost allocation of $93,375,000 to be assumed by the New York Power Authority and to be reimbursed to the Treasury by the self-liquidating power project over a 50-year period. The House was favorable but the Senate was opposed, and finally, late in 1944 defeated the proposal by a vote of 56 to 25. In the meantime, July 1942, MacArthur Lock of 31 feet over the sill had been completed as a fifth lock at Sault St. Marie. Hope of construction under the Executive Agreement had disappeared after Pearl Harbor in view



Water Level Profile: Great Lakes-St. Lawrence System

of the shortage of steel and manpower, as President Roosevelt himself admitted.

The Joint Resolution Phase. A third start to effectuate construction was begun in 1945 when Governor Dewey of New York and President Truman expressed themselves as favorable to the project. A new approach was finally initiated in 1947 when Senator Vandenberg introduced Joint Resolution III providing for *self-liquidation of navigation costs* by authorizing the *collection of tolls.* But the Senate remained obdurate by defeating the measure in 1948 with a vote of 57 to 30 to recommit the measure to the committee for further investigation.

The Final Formulation. Once more conferences were held to rejuvenate the project to the accompaniment of additional studies, surveys and report. In July 1948 separate applications were filed by the New York Power Authority and by the Hydroelectric Power Commission of Ontario for an Order of Approval from the old International Joint Commission under the Boundary Waters Treaty of 1909 of the joint project for *developing power.* Simultaneously the New York Power Authority applied to the Federal Power Commission for a license to carry out the American portion. Later in the year a competing application for *private development* was made to the Federal Power Commission by the Public Power and Water Corporation of New Jersey.

While the applications were pending Congress renewed consideration of the entire project. Canada was becoming increasingly restive under these delays. In repeated messages President Truman urged action, and in his budget message of 1950 recommended an appropriation for preliminary work because the Seaway was urgently needed for access to Labrador iron ores, so necessary for defense. A new note was supplied by the Canadian Minister of Transport when in a radio address he suggested that an *all-Canadian* route be considered should agreement not be reached with the United States. The project once more landed in the lap of Congress when early in 1951 the Federal Power Commission denied the application of both the private corporation and the New York State Power Authority, but *recommended* federal construction of the entire project. Like a cat with nine lives, the Seaway Project survived all these legislative vicissitudes, emerging finally as the Wiley Bill.

The Present Project

Certain preliminary but definitive steps should first be noted. On June 30, 1952 Canada and the United States submitted concurrent applications to the International Joint Commission for an Order of Approval of the Power Proiect. After hearings, the order was issued in October 1952. Also concurrently the Federal Power Commission was reconsidering the application of the New York Power Authority for a license to construct, in conjunction with the Ontario Hydroelectric Power Commission, the dams and necessary power works in the International Rapids Section as approved by the International Joint Commission. The license was granted in May 1953. Under the Wiley Bill the *navigation facilities* in the International Rapids Section will be constructed in United States territory by the St. Lawrence Seaway Development Corporation. Corresponding facilities in the Canadian section will be completed by the St. Lawrence Seaway Authority of Canada, thus providing a seaway of 27-foot depth from Lake Erie to Montreal. From here a minimum 35 foot channel is available to the open ocean. (See map.) The work in the Thousand Islands section will consist of deepening and improving the channel to the specified deptn at

scattered locations. By withdrawing Senate amendments which called for the deepening of several channels above Lake Erie as already explained, the legislative issue was restricted to United States participation in only one improvement but which was the major limiting factor and to secure which Canada was prepared to go it alone. Navigation improvements in the upper basin are to be incorporated in separate legislation to be dealt with in the future on their own merits.

Provisions of the Seaway Act of 1954. As finally passed on May 7 and signed by President Eisenhower on May 8, the Seaway Act adopts some of the principal provisions of the Tennessee ValleyProject Act of 1933, although differing from it in certain essential respects, especially as these relate to power policies. Although an integral part of the underlying conception of multiple-purpose development, the act in its terms separates the navigation function from the power production function, handing the latter over to the state of New York or some other licensee of the Federal Power Commission. The national security is an ambient purpose surrounding the entire enterprise as is the economic development of the entire Great Lakes-St. Lawrence River basin.

The act creates a public corporation with the usual powers to be known as the St. Lawrence Seaway Development Corporation as an instrumentality of the United States subject to the direction and supervision of the President or the head of such agency as he may designate. It is generally understood that the Corps of Engineers will be the construction agency and that the Secretary of the Army will supervise the corporation. Management, instead of being vested in a Board of Directors as the original bill provides, was placed in the hands of an administrator and a deputy administrator. An advisory board of five members is set up who are not to act in an administrative but in a consultative capacity. All are to be appointed by the President with Senate confirmation. Administrator and deputy are to be paid annual salaries of $17,500 and $16,000 respectively.

The corporation is authorized, in cooperation with the St. Lawrence Seaway Authority of Canada, to construct, operate and maintain the single-stage navigation project in the International Rapids section and to do the necessary dredging in the Thousand Islands section. But it must first receive satisfactory assurance from Canada that the navigation works in the Candian section of the river will be completed as authorized by Parliament in 1951. It is also required to coordinate its activities with the New York Power Authority, which was licensed by Federal Power Commission to construct and operate the power works authorized by the International Joint Commission in 1952.

The corporation is directed to borrow $105,000,000 through the sale of revenue bonds bearing interest at the current average rate of interest on current marketable bonds of the United States with comparable maturities. To make the project self liquidating the corporation is directed to negotiate an agreement with some agency designated by Canada governing the tolls to be levied on the Seaway and an equitable division of the revenues. If no agreement is reached, the corporation is directed to establish rates *unilaterally* after public hearings for the use of the United States-owned portion of the Seaway. Tolls or changes in tolls must be approved by the President, are subject to rehearing by the corporation upon complaint and the corporation's final orders are subject to review in the courts.

A Yardstick for Liquidation. The yardstick for establishing tolls is laid down in

five specific rules: (1) the rates shall be fair and reasonable, with consideration being given to the special character of cargoes such as bulk agricultural, mineral, and other raw materials; (2) rates shall vary according to the character of the cargo; (3) rates for vessel and ballast may be less than rates for passengers and cargo; (4) the rates shall be calculated so as to cover the costs of operating and maintaining the works of the Corporation, including depreciation, interest on obligations, and payments in lieu of taxes; and (5) rates shall be calculated with a view to providing sufficient revenue to amortize principal and debts and obligations of the Corporation over a period not to exceed 50 years. The spirit of the proponents of the Seaway is succinctly put in the words of Senator Wiley, Chairman of the Foreign Relations Committee: "At long last our efforts are crowned with victory." And the general conclusion was best expressed by the Senate Committee on Foreign Relations, in recommending "that the bill (S. 2150) do pass," which concluded as follows:

"The committee is profoundly aware of the extensive studies, surveys, debates, and discussions which have attended the St. Lawrence project throughout the years, and of the many arguments advanced for and against the Seaway. After careful consideration of all the arguments, the committee is convinced that the United States' participation in the St. Lawrence Seaway project, Lake Erie to Montreal, is in the interest of the security of the United States, is economically desirable and sound, will pay for itself out of its earnings, and is a wise undertaking for the United States and Canada to build and operate jointly. Its true perspective is continental and its final results must inevitably be continental in their impact."

The Power Project. The power portion of the combined project may be summarized as follows: A 50-year license to construct, operate and maintain the power facilities on the American side of the International Rapids section was issued on July 15, 1953 to the Power Authority of the State of New York by the Federal Power Commission. It is required to cooperate with the Corps of Engineers in constructing and improving navigation facilities associated with the power project and to furnish power free of cost for the operation and maintenance of the navigation facilities. The use, storage and discharge from storage of waters affected by the license are made subordinate to the reasonable rules and regulations as prescribed by the Secretary of the Army in the interest of navigation, or by the Commission for the protection of life, health and property and for recreational purposes.

Under this license the Federal Power Commission will determine the "actual legitimate original cost" of the initial project and any improvements thereof, upon which the Power Authority is entitled to earn, after the first 20 years of operation, six percent per annum upon the net investment. Earnings above this specified rate of return are regarded as surplus earnings, one-half of which may be used to make up any deficiency below the stipulated return in the past or to establish amortization reserves to retire the investment. In addition the licensee must pay fees based upon power output to reimburse the United States for the costs of administration. The license also requires the Power Authority to make a reasonable portion of the power capacity and of the power output available for use within the economic market area in neighboring states. The Federal Power Act also makes the projects recapturable by the United States upon termination of the license or transferable to a new licensee, in either case upon payment of the net investment.

Construction will be undertaken jointly with the Ontario Hydroelectric Power Commission and will be in accordance with the requirements of the Order of Approval of the International Joint Commission issued in October 1952, which follow the plans outlined in the joint agreement of 1941 between this country and Canada. These include the power house and spillway dam at Barnhart Island, together with supporting structures for a reservoir providing some eighty-odd feet of head. One-half of the available power, computed at 1,250,000 h. p., is assigned under the license. Construction must begin within a year and be completed within seven years.

Estimated Cost of the Project

The Army engineers, thoroughly familiar with this project and increasingly conservative in their estimating, have placed the cost of the United States portion of seaway construction at $88,-074,000. Including the Canadian share of construction cost of $174,950,000, the total cost of the 27-foot channel from Lake Erie to Montreal is estimated to cost $263,024,000 at December 1952 cost levels. The following tabulation breaks these costs down in accordance with the significant sections.

Section	Canada	United States	Total
Welland Canal	$2,000,000	—	$2,000,000
Thousand Islands section	—	$1,766,000	1,766,000
International Rapids section	— —	86,308,000	86,308,000
Canadian section	172,950,000	—	172,950,000
Total	$174,950,000	$88,074,000	$263,024,000

According to a "normal schedule" of construction, the time is estimated at six years, while an "accelerated schedule" would require five years. The amount appropriated for the project of $105,000,-000 will benefit a section of the country which has not been the recipient of federal aid to the same degree as have other sections. The Committee compares it with the costs of the Suez Canal of $80,000,000, the Chicago drainage canal of $53 million, the Welland Ship Canal (already constructed by Canada) of $131 million, the Panama Canal of $375 million. Since the project is expected to be self-liquidating through shipping tolls, it will not be a burden upon the taxpayers and the Committee anticipates that substantial profits may continue to accrue to the Federal Treasury after the payoff period of 50 years or less.

Estimates of Annual Costs and Revenues. The foregoing conclusion as to the financial capacity of the navigation project to reimburse the Treasury rests upon the following estimates:

Item	Canada	United States	Total
First cost of navigation work	$174,950,000	$88,074,000	$263,024,000
Add int. during construction 3%	15,746,000	7,927,000	23,673,000
Total naviagtion investment	190,696,000	96,001,000	286,697,000
Annual interest and amortization 3%	7,418,000	3,734,000	11,152,000
Annual maintenance and operation	2,000,000	1,460,000	3,460,000
Annual carrying charge	$9,418,000	$5,194,000	$14,612,000

To meet the annual carrying charge of $14,612,000 the Committee estimates that bulk traffic consisting of iron ore, grain, coal and petroleum will be rapidly available, with substantial amounts of traffic in other commodities. As estimated by the Department of Commerce, a traffic ceiling of 50 million tons may be

assumed as wholly reasonable, based upon the amount of traffic presently using the 14-foot channel. The required toll revenues to meet average annual carrying charges could be obtained from an average toll of 29 cents per ton if 50 million tons of cargo are available. With only 45 million tons available, average tolls would have to rise to 32½ cents per ton and to 36½ cents per ton with only 40 million tons available. With additional revenues forthcoming from the deadweight tonnage of ships returning empty, the Committee was convinced that the revenue potentials from the Lake Erie to Montreal section of the seaway would make the project self-liquidating. Earlier revenue estimates by the Department of Commerce with tolls ranging from 25 cents to $1.25 per ton forecast annual revenues varying between $36 million and $49 million.

Some Reservations. In presenting these estimates of seaway finances attention should be directed to the fact that the burden of carrying the joint costs has all been allocated to the power phase of the joint project. Since the International Rapids power section affords the most economical power site in North America these joint costs can be added to the power costs and still keep unit power costs well below the level of other power costs of the region. The failure to allocate some of these joint costs (hitherto assumed to be one-half) to the navigation phase was the reason assigned by Commissioner McWhorter of the Federal Power Commission for his dissent from the order of approval by the International Joint Commission. Chief of Engineers, Lt. General Pick, had estimated that facilities having joint value for navigation and power development would aggregate $212,807,000. This failure to allocate has served to reduce navigation costs and to ease their eventual liquidation.

The Committee deemed it inadvisable to suggest legislation which would provide for the deepening of the connecting channels of the Great Lakes because that portion of the seaway project should be considered separately on its own merits. Since this phase of the seaway project is already being considered by Congress, some estimates of the probable cost of these improvements should also be shown. Furthermore, we will include the power phase in these estimates in order to give a complete picture of this dominantly dual-purpose project. Beginning with the project in its present state of improvement the following calculations of cost for the remaining work to be done to convert the 14-foot waterway into a 27-foot waterway with coincidental power production are derived:

Item	Canada (000 *are omitted*)	United States	Total
Total Cost of remaining work	$457,369	$471,574	$928,943
Less allocation to power	223,076	223 076	446,152
Balance chargeable to navigation	234,293	248,498	482,791
Add interest during construction	21,086	20,871	41,957
Investment in navigation	255,379	269,369	524,748
Annual interest and amortization	9,934	10,093	20,027
Annual maintenance and operation	2,306	2,192	4,498
Annual carrying charge	12,240	12,285	24,525

By estimating benefits to a minimum traffic aggregate of 64 million tons in terms of savings in transportation charges, calculated as the differential between the cost of water transport without tolls and the cost of the cheapest alternative means

of transport, the staff of the Deputy Chief of Engineers derived a figure of $60 million annually. This, in the opinion of General Robinson, establishes the economic feasibility of the overall seaway project because the ratio of benefit ($60 million) to cost ($24½ million) is 2.45. Comparing an estimated potential toll revenue of $36.5 million with the same cost establishes a revenue-cost ratio of 1.49.

As to one's faith in these prognostications, we can do no better than once more to quote the committee, whose makeup was essentially conservative:

> "The Great Lakes-St. Lawrence Seaway stands in a class by itself in that it can be made self-liquidating. No such potential traffic could be visualized for either the Panama Canal or the Suez Canal as is now anticipated for the St. Lawernce Seaway. While in the initial stages the project is to be financed with the assistance of the Federal Government, the seaway ultimately will be built and operated at no cost to the taxpayer. The tolls on the traffic using the navigation facilities will make the project self-liquidating. The related power phase will represent no cost to the Federal Government, since the State of New York has been granted a license to construct the power facilities jointly with the Hydroelectrical Power Commission of Ontario and to share the costs previously classified as common to power and navigation."

The representative of the railroads opposing the project made much of these "omitted costs" and of the fact that the waterway will not be available for about five months of the year. There can be no doubt that these negative considerations are of some importance. The deepening of lake harbors is certainly an essential part of the ultimate unfolding of the project. What these costs will amount to and how they will be borne is problematical. Railroad interests reckon them as considerably in excess of $100 million. Until sufficient experience has been had with actual operations, making more facts available, resolving some doubts and perchance creating others, one must reserve judgment on long range calculations such as these. Yet the action taken was undoubtedly wise because the present project has reduced these risks to a minimum. That has been its strength.

The Iron Ore Situation

In evaluating the economic feasibility of the present project and its future impact upon the region, the situation with respect to iron ore should be briefly reviewed. As presented at the hearings, the undisputed facts appear to be that annual steel production in the United States developed from a mere 13,259 net tons in 1860 to 15,199,848 in 1951. Much of this production is now concentrated in the Great Lakes region, making this the greatest industrial area in the world since it produces over 35 percent of the world's steel. The Ruhr of Germany "is not even a close second." This concentration has been made possible by the fact that iron ore has been at one end of the Great Lakes water haul and coal at the other. Since 1910 over 80 percent of the ore requirements has come from the Lake Superior regions, depleting these high grade supplies at such a pace that the industry estimates—and these estimates are confirmed by the findings of the Paley Commission—that only 13 years' supply of high grade (50%) ore are still available. Of estimated United States iron ore reserves of 79 billion long tons, 64 billion tons are in the Lake Superior district but only 1.6 billion tons are first grade. Ores of 25 to 35 percent content, called taconite, aggregate 60 billion tons but this can not be used economically without "beneficiation" (eliminating impurities) at the mines. This is now being done and the development of taconites will be expanded. But increasing reliance is being

placed upon the development of high-grade foreign ores in Liberia, Venezuela and Labrador.

As the Paley Commission reported:

"During the next quarter century there will be marked shifts in the sources from which the steel mills of the United States will draw their supplies of ore. Production from high grade reserves in the Lake Superior region must eventually decrease. Production from taconite may be able to offset this decline, leaving output of the Lake Superior region close to the present level of 90 million tons. Expansion in consumption can be achieved only through larger imports. Shipments from Canada and Venezuela in the volume approaching 65 million tons could meet the probable requirements and it is likely that such a volume of shipments can eventually be attained."

Since most of the Labrador ore is owned by steel companies in the Great Lakes region, it is this ore which will provide tonnage for the haul from Seven Islands port through the improved St. Lawrence River channel, canal and lock section. In the event of another war emergency, these shipments could be greatly increased. Even in peace time it is estimated that 80 percent of the traffic would originate or terminate in the United States, making our participation in the construction and control of the project imperative.

The Seaway and Competition

It would seem that in the long run the fear that competing facilities will be irreparably injured will not be realized. The Seaway is expected to stimulate both the regional and national economy by unlocking natural resources, by reducing transportation costs for commodities that should move by water, and by providing a new and auxiliary transport route that should develop new channels of trade. While North Atlantic ports may initially suffer some loss from traffic diversion, as will their connecting carriers, this will be more than offset by the growth of new traffic.

Opposition to the Seaway is particularly virulent in the Atlantic and Gulf ports, because it would decrease their traffic and cause a drop in employment. The Port of New York Authority estimates the drop in employment at 200,000 for the metropolitan area. It also points to the seasonal effect upon its business because the Seaway will be ice-bound for five months. Boston contends that it will lose 30 percent of its port traffic, while New Orleans and Houston estimate even larger losses. Buffalo argues that its grain business will suffer, though it admits that there may be some compensating gains from increases in iron and steel production. The deepened channel may have the effect of revitalizing the shipbuilding industry in the Great Lakes area and elsewhere, though it is believed that the major competitive advantage will first accrue to the smaller foreign vessels because only a small percentage of American flag vessels will be able to use the Seaway. Canadian water transport will be greatly advanced because it will help unlock its undeveloped natural resources. Even Canadian railroads have favored the Seaway because of its effect in promoting general economic development in Canada. It is, of course, impossible to properly assess these contending claims based upon a static economy, because both the American and Canadian economies are highly dynamic.

The railroad and coal interests have been the hard core of opposition to the Seaway and power projects. The railroads, in particular, voice their criticisms that it would be a useless addition to our transportation system, vulnerable to air attack and designed only to provide low cost transportation of iron ore for steel companies. The Department of Defense does not disagree with this argument

pointing out that the Seaway is almost submarine proof, that it will not require naval convoys as the all-ocean routes from Venezuela, Liberia, Brazil, Sweden and others would and that it can be defended from air attack. Military experts regard reliance upon rails alone as inadequate to meet war-time needs. Moreover, these facilities have been decreasing since World War II and without seaway transportation the price of iron ore would increase. Also, in the event of a hot war, water transport facilities, being more flexible, can be more rapidly expanded than rail facilities. If the Seaway is not constructed, the next 25 to 50 years will see the migration of the steel industry to the seaboard, where costs will be higher and where the relocation of steel will have a dislocating effect upon other industries.

The economic position of railroads with terminals on the Great Lakes is different from that of railroads in the rest of the country, although all of them made a common cause of opposing the project. It should be recalled in this connection that railroad executives of northwestern rail lines favored construction of the project in the twenties. Not only did they point to the internal economy obtainable from the relief of traffic congestion in the East, but they also saw revenue improvement due to increased car efficiency from the quicker return of rolling stock from lake ports. But even more important was the effect they foresaw of lower cost deepwater transportation in extending the marketing radius of goods, thus developing railroad traffic to and from the ports.

Perhaps the best note with which to conclude is to quote from an address by Howard Elliot, then President of the Northern Pacific Railroad, to the Harvard Club in 1924: "This is a great project national in scope and influence. . . . . The project will be beneficial to New England and to all of the country tributary to the Great Lakes. It will relieve congestion on the upper Atlantic ports, when population and industry are twice what they are today. The project will help coastwise trade, export and import trade between middle western states and foreign countries and give greater opportunity to our merchant marine fleet."

Land Economics completes, with this issue, thirty years of continuous publication, Professor Ernest M. Fisher, Professor of Urban Land Economics, Columbia University, pays tribute in these words: *It seems almost impossible that this year can be the thirtieth anniversary of the establishment of the Journal. But when I count the volumes on my shelf, I see there are thirty! The unbroken series is a valuable part of the materials with which one must be concerned who is interested in the problems of urban land and particularly urban housing.*

The Journal reflects to me two major aspects of our work. The first is the increase in the volume of the material available and in the scope and content of the work done in the field. The second is a new appreciation of the vast task that remains, the perspective of which has been so conspicuously drawn in the pages of the Journal.

If it be not too morbid, I would add that another feature for which I have treasured the Journal is that it contains the record of many of our colleagues whose accounts have been closed during the period but whose memory still inspires us.

Race and Residential Market Values in Chicago

By E. F. SCHIETINGER*

THIS article concerns a study that was directed toward illuminating the relationships which exist between residential market values and race of occupants, a study, specificially, of the effect which Negro occupancy appears to exert upon the price of real estate in certain Chicago residential areas.[1] The bulk of the data was taken from areas which were in process of racial transition at some time during the period 1940-1951.

The scientific antecedents of the general subject are found primarily in the literature of land economics and human ecology. These two disciplines have shared a strong dependence upon the concept of competition. Land economists, like other economists, viewed competition essentially as a regulating mechanism which establishes value or price; they were concerned with the analysis of variations in land values.[2] For the human ecologists, competition was an impersonal, unconscious process, conceived as a regulating mechanism, not only of market values but also of location in a spatial and temporal pattern.[3]

In America the human ecologist has usually been first of all a sociologist, or student of human groups. For this reason, land value was not a relevant object of inquiry for him until it was related to specific social institutions or groups. The human ecologists became intrigued by the way in which spatial distributions were reflected in variations of land value. *Der Isolierte Staat*, Johann H. von Thunen's 19th Century model of land use in relation to centers of dominance, became a prototype in the search for laws of land use distribution in cities. The competitive struggle for space was seen to reach equilibrium both in terms of location and in the index of land value.

In analyzing the distribution process, urban ecologists dealt with concepts such as succession, invasion,[4] and segregation, relating them to changes in the pattern of "natural areas" in the urban complex. Thus arose a concern over the dynamics of socio-economic, ethnic, and racial regroupings as a major factor intruding both upon the distribution of land use and upon variation in land values. The

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[1] For details see the writer's "Racial Succession and Residential Property Values in Chicago," (unpublished Ph. D. dissertation, Department of Sociology, University of Chicago, 1953). The following organizations actively cooperated or provided support which made possible the research upon which the dissertation is based: American Friends' Service Committee, Anti-Defamation League of B'nai B'rith, Chicago Title and Trust Co., Committee on Education, Training, and Research in Race Relations of the University of Chicago, Draper and Kramer (Realtors), Metropolitan Housing and Planning Council of Chicago, Peoples Gas Light and Coke Company. Their assistance, as well as that of the many individuals who contributed time and counsel, is gratefully acknowledged. A critical reading of the present report by Albert D. Biderman was very helpful.

[2] An early treatment which applies to urban land is Richard M. Hurd, *Principles of City Land Values* (New York: *Record and Guide*, 1903). The best know work which specifically relates to Chicago is Homer Hoyt, *One Hundred Years of Land Values in Chicago* (Chicago: University of Chicago Press, 1933).

[3] The major concepts of human ecology were first brought together in the two volumes, R. E. Park, E. W. Burgess, and R. D. McKenzie, *The City* (Chicago: University of Chicago Press, 1925), and E. W. Burgess, *The Urban Community* (Chicago: University of Chicago Press, 1926).

[4] A typical definition of succsion is offered by Harold A. Gibbard; "The term succession refers to changes that take place over time within fixed areas. More specifically, it conceptualizes the processes entailed in the displacement of one type of land use or type of resident by another type." Seba Eldridge and Associates, *Fundamentals of Sociology* (New York: Thomas Y. Crowell Company, 1950), p. 208. Among writers in urban ecology, the term succession is generally used in referring to the total change which occurs during this displacement. The concept invasion suggests the ongoing process by which succession takes place; invasion need not necessarily terminate in completed succession. The term invasion, adapted from the plant ecologists, is used without invidious connotations suggesting hostility on the part of "succeeding" residential groups.

question of Negro residence and its effect upon land values as a result of the succession process was given particular emphasis.[5]

The theoretical problem presented by the human ecologists with respect to the competitive struggle for space may be empirically investigated, but such an investigation must proceed within the bounds of certain methodological limitations. In the present instance the problem has been redefined in order to fit within the realities of data availability and current areas of public concern; competition for space has, in this study, been confined to competition for living space or residential real estate—the focus upon land values has been superseded by a concentration upon real estate prices.

Hypotheses

At the outset it was assumed that generalizations may be established regarding a model price cycle associated with racial succession. It was further assumed that this price cycle exists due to fairly uniform historical conditions of succession in American cities and to uniform expectations by persons accustomed to the conventions of American residential patterns. Specifically with respect to Negro succession, it was postulated that:

(1) Real estate prices observe a uniform pattern of decline during the threat of invasion, of increase during invasion, and that the subsequent price level is determined by prevailing intensity of use.

(2) Public opinion associates Negro occupancy in general with price deterioration because (a) all sales to Negroes become identified with the price decline attendant upon sale during "threat" and (b) tax assessment practice is subject to predispositions associating value depreciation with Negro occupancy.

(3) Price and financing discriminations during the transition to Negro occupancy result in excessive financial commitments by Negro purchasers, making overcrowding mandatory even for the "family-type" buyer, which in turn eventuates in physical deterioration of property.[6]

In implementing a test of these hypotheses, the market behavior of buyers and sellers was examined by indirect observation; an awareness of value premises which attend these market actions is implicit. But it is well to underline the fact that the investigation did not constitute a study of attitudes. The data which were gathered establish an objective basis from which at best may be *inferred* some prevailing motives which underlie observed market behavior.

Procedure

Given the objective that real estate prices should be compared at various

[5] See, for example, Ernest W. Burgess, "Residential Segregation in American Cities," *Annals of the American Academy of Political and Social Sciences*, November 1928, pp. 113-114. A lucid discussion of the problem and some important variables affecting it appeared over thirty years ago in Chicago Commission on Race Relations, *The Negro in Chicago* (Chicago: University of Chicago Press, 1922), pp. 194-215. Empirical studies since then include Paul F. Cressey, "The Succession of Cultural Groups in the City of Chicago," (unpublished Ph. D. dissertation, Department of Sociology, University of Chicago, 1930); Elsie Parker, "Both Sides of the Color Line," *The Appraisal Journal*, January 1943, p. 245; George W. Beehler, Jr., "Colored Occupancy Raises Values," *The Review of the Society of Residential Appraisers*, September 1945, pp. 3-6; E. F. Schietinger, "Real Estate Transfers during Negro Invasion," (unpublished M. A. thesis, Department of Sociology, University of Chicago, 1948); Richard Marks' "The Impact of Negro Population Movement on Property Values in a Selected Area in Detroit," (Summary and Conclusions, January 16, 1950, based on an unpublished study made for the Mayor's Interracial Committee of the City of Detroit, mimeographed); Belden Morgan, "Values in Transition Areas: Some New Concepts," *The Review of the Society of Residential Appraisers*, March 1952, pp. 5-10; Luigi M. Laurenti, "Effects of Non-white Purchases on Market Prices of Residences," *Appraisal Journal*, July 1952, pp. 314-329; Richard S. Wander, "The Influence of Negro Infiltration upon Real Estate Values," (unpublished M. A. thesis, Department of Anthropology and Sociology, Wayne University, 1953).

[6] Abstract No. 294, *Inventory of Research in Racial and Cultural Relations*, Bulletin No. 2 (December 31, 1948), p. 59. These hypotheses were formulated upon completion of a previous study concerning the pattern of Negro invasion. They represent a combination of the impressions gained from that study and of opinions current among contemporary students in this problem area.

points in the cycle of racial succession, procedural problems were resolved into two major questions: (1) what real estate should be chosen for study, and (2) how should differences in price levels be determined?

An ideal design would call for a group of items subjected to the influence of one independent variable while another group of similar items is not subject to this influence, although all other conditions affecting the two groups are identical. In such a case the items would be units of real estate and the independent variable would be extent of Negro occupancy. The observed dependent variable would be the price at which these units of real estate sold at successive points during the period of study.

Studies of racial distribution in American cities have emphasized the succession cycle as a mass phenomenon which ordinarily involves entire areas within cities. Therefore it was determined, at the cost of reduced physical comparability, to contrast real estate by groups representing specific geographical areas, rather than by groups chosen from the city-wide universe of real estate in each succession stage.[7]

The heterogeneity of architectural types, the spottiness of sales, and the relatively limited universe of housing which qualified as representative of given succession stages were recognized as obstacles to the matching of individual structures from areas compared. It was determined instead that areas of optimum over-all physical comparability would be chosen and that systematic sampling or complete counts from these areas would be relied upon.

It is believed that this objective, implementing the comparison of succession areas and stages, was met. However, the quality of this comparison is limited because the effort to provide adequate control samples was not realized. An area intended for control or yardstick purposes was chosen on the North Side of Chicago for comparison with study areas on the South Side of Chicago, but resources were insufficient for its successful exploitation in the control function.

The Chicago South Side areas selected for comparison with one another at various succession stages are these:

(1) Five census tracts in the Woodlawn Community Area, which were divided into the following sub-areas as of 1948: (a) Woodlawn area A—a tract (No. 629) which was threatened by invasion. (b) Woodlawn area B—a tract (No. 627) in the stage of influx. (c) Woodlawn area C—two tracts (Nos. 623 and 624) which were saturated. (d) Woodlawn area D—a tract (No. 625) of long established Negro residence.

(2) Three census tracts (Nos. 885, 888, and 889) in Greater Grand Crossing Community Area which represented a better quality of housing, larger proportion of single-and two-family structures, and greater hostility among current residents toward incoming Negroes.

(3) Six blocks in the Oakland Community Area, substantially invaded by 1948, which were the subject of a previous pilot study.

(4) Nine blocks in the Kenwood Community Area which consisted of mansion-type real estate zoned for single-family occupancy, where invasion had barely begun in 1948.

[7] No standardized terminology of succession stages exists. The *ad hoc* sequence of terms used in the present study assumes the existence of areal demarcations to which the scheme of definitions is referenced: (a) pre-threat—absence of invasion or contiguity with an area of invasion; (b) threat—contiguity with a penetrated area; (c) Penetration—presence of one or several invading residents in an area; (d) influx—rapid occupancy by invading residents subsequent to initial penetration; (e) saturation—complete or nearly complete occupancy by invading residents subsequent to influx; (f) consolidation—occupancy subsequent to completion of the succession cycle. No systematic division between the stages of saturation and consolidation is offered since these two phases are entirely continuous; the term "consolidation" is convenient for labeling the extension of data beyond the time limits of the succession cycle. Similarly, the terms "threat" and "pre-threat" designate extensions into the periods *preceding* succession proper.

In Oakland and Kenwood, complete counts of single-family structures were made. In the other areas, structure listings were stratified by size in dwelling units; systematic samples were drawn from the strata of smaller structures, and complete counts were made for larger structures, the cutting point between "larger" and "smaller" strata depending in each area upon the number of structures within the respective size groups. The currently (1948) transitional tract in the Woodlawn Community Area was further divided by race of occupancy as determined by a house-to-house canvass, and a complete count of all Negro occupancies was made. The total number of structures selected from these areas aggregated 1600.

Prices on 1940-1951 sales of these structures were determined by estimates based upon documentary tax stamps on deeds of conveyance in the public record.[8] This source was validated by data from the North Side "yardstick" area centering about Lawrence and Western Avenues; documentary tax stamp *estimates* of 75 sales prices were compared with *known prices* for these sales as evidenced by the records of real estate brokers who furnished information for the study.[9]

Price estimates were summarized by size-of-structure and study area groups for time periods illustrating succession stages. Estimates of absolute price were converted into price relatives in order to achieve a modicum of standardization; this consisted of dividing each estimate by the assessed valuation which obtained for the structure in 1940. These price relatives were appropriately grouped and summarized as arithmetic means. To eliminate the influence of change in dollar values, prices for each area were reduced to an index based upon the grand mean during each period. The price summaries which are based upon these measurements were calculated to take account of differentials in financing costs. By studying parallel movements of price, both with and without these costs, it was possible to assess the influence of this factor, which is often alleged to be associated with race differences.

The Market Pattern

Before carrying out the analysis of price movements in all the areas studied, an intensive investigation of data from the Woodlawn Community Area census tracts was conducted to make possible a general description of real estate market activities during succession.[10] This dealt with the following subjects: rate of turnover, methods of financing, price differentials by race, differentials by conversion. The findings of this investigation are briefly summarized at this point. Since space does not warrant the presentation of substantiating data, observations which might be considered inconclusive are not reported.

With respect to turnover, it was found that in-movement by Negroes was accompanied by greatly increased sales activity. Moreover, it was obvious that sales of those structures first to be occupied by Negroes had accelerated in volume prior to the time of Negro invasion; brief duration of prior ownership was associated with Negro acquisition. A disproportionate share of this early sales

[8] The details which are involved in applying this method of determining prevailing real estate sales price are comprehensively described in Illinois Tax Commission, *Tax-Rate Limits and Assessment Ratios, 1925-1940*, Volume 8 of *Survey of Local Finance in Illinois* (State of Illinois: 1940).

[9] The mean of the "known" distribution was $16,411 and the mean of the corresponding "estimated" distribution was $16,301, with a .99 coefficient of correlation and a standard error of estimate of $1092. This validation is obviously not drawn from the same universe represented by the 1600 South Side structures which were studied; it does add to previous evidence that tax stamp estimates are on the average dependable in Chicago.

[10] A preliminary report on price movements in these tracts is contained in E. F. Schietinger, "Racial Succession and the Value of Small Residential Properties," *American Sociological Review*, December 1951, pp. 832-835.

acceleration was accounted for by one- and two-family structures; three and four flats became increasingly active with subsequent stages of invasion and its consolidation.

The invasion financing pattern included a high proportion of second mortgaging, land contract sales, and resort to part-purchase mortgaging, although the very beginning of invasion saw a sharp, short-lived drop in the latter two "seller involved" types of financing. This local reluctance to facilitate invasion is further illustrated by the activities of the financing agencies. Woodlawn institutions dominated the financing of one- and two-family properties prior to invasion and outside agencies had a greater share in financing large properties, but with the beginning of invasion, outside agencies accounted for an increased share of one- and two-family property financing. Local institutions again dominated, once the invasion was accepted.

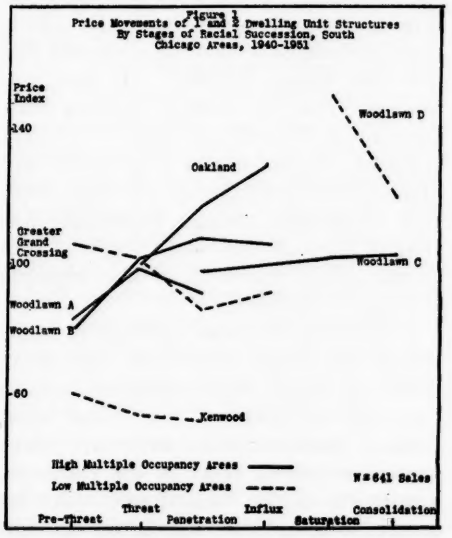
That Negroes paid significantly more than did white purchasers for similar types of real estate in the same area during invasion is an observation that applied to all sizes of structure for which substantial numbers of sales occurred. It should be noted that for structures of three or more families some of this difference is due to financing differentials.

Conversion of structures appeared to be unassociated with rate of turnover. In general, converted structures showed a favorable price differential when compared with unconverted structures, but where conversion (and consequently neighborhood deterioration) had proceeded farthest, the price differential in favor of converted structures tended to disappear.

Price Differences

The central objective of the study, measurement of price movements during succession, was accomplished in all the study areas for the period 1940-1951. Figure 1 is a schematic representation of the price changes which were observed for groups of singles or of one- and two-family structures in each area during stages of succession. No time reference is given, since the stages do not coincide for the various areas. In none of the areas is it possible to follow through all stages of succession during this relatively brief period.

Figure 1 is interpreted by giving attention to the *general direction* of each price movement. Differences in the general



level of each price curve reflect differentials in assessment practice, since the price relatives are expressed as proportions of assessed valuation. These differences in magnitude may be ignored for the present purpose. Similarly, it must be remembered that variations in duration of the succession stages will account for some of the differences in the degree of change which is observed.

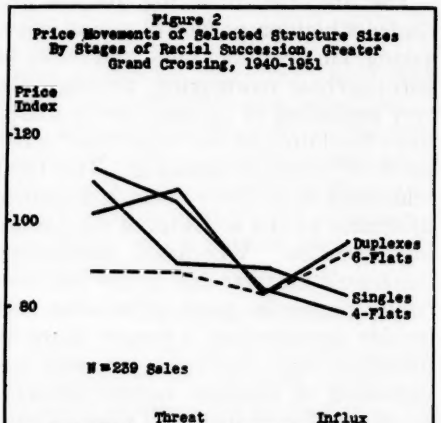
As the sequence of stages proceeds from "pre-threat" to "threat," it is ob-

served that prices in the three areas of high multiple occupancy exhibit an upward movement, while those in the low multiple-occupancy areas move downward.[11] This essential difference is in fact the major feature to be observed through the next two stages, penetration and influx—disregarding short-term fluctuations from stage to stage and concentrating upon long-term movement. It is apparent that, in these areas, price increase is associated with high multiple occupancy while price depreciation accompanies low multiple occupancy.

It is not entirely satisfactory from a methodological point of view to incorporate into this scheme two areas for which the early stages of succession do not fall into the period studied. It appears, however, that the addition of data from these areas (Woodlawn Areas C and D) provides a logical sequel to the previously observed pattern; the area of high multiple occupancy remains practically stationary through the latter stages of succession while the area of low multiple occupancy declines.

Unfortunately, price movement summaries for larger structures, the prevalence of which characterizes an area as "multiple-occupancy," are based upon limited evidence; since there are fewer larger structures, there is less turnover. Inspection of the limited sales data for larger structures in the areas of high multiple occupancy reveals no uniformity in price movements when compared with movements for smaller structures in these areas. In other words, size of structure does not appear as a uniform influence upon price within areas. The one area for which a representative scheme of comparison is possible for all size groups through a sequence of four stages happens to be an area of low multiple occupancy —Greater Grand Crossing (see Figure 2).

Figure 2
Price Movements of Selected Structure Sizes By Stages of Racial Succession, Greater Grand Crossing, 1940-1951



The influence of size appears to operate here as might be expected; smaller structures (one through four dwelling units), which predominate in this area, exhibit uniform price movement—downward. Large structures (six flats) remain stationary during the four stages of succession which are traced in this chart.

Conclusions

It is beyond the scope of this article to attempt a complete dissection of the variables which are involved in this contrast between market behavior in areas of low multiple occupancy and areas of high multiple occupancy during a period of sustained pressure upon the supply of housing available to a particular minority group. To the reader who is familiar with prevailing attitudes and expectations regarding patterns of residential accommodation by race and nationality groups in the United States, it must be apparent that preoccupation with "population character" continues to exert a powerful influence upon the

[11] "High multiple-occupancy" areas are those in which the average number of dwelling units per structure is comparatively great while in "low multiple-occupancy" areas this value is small. In 1940 these areas ranged from a dwelling unit-to-structure ratio of approximately one to one in the Kenwood zone of single-family occupancy through the following values: Greater Grand Crossing, 2; Woodlawn Area D, 2.4; Woodlawn Area C, 3.9; Woodlawn Area A, 4.1; Woodlawn Area B, 4.3; Oakland, 5.8.

definition of effective demand for certain categories of housing. "The social status and the standard of living, the racial and ethnic composition of their neighborhoods are issues to which people in our society are sensitive."[12] Conversely, it seems obvious that the impersonal interplay of the market as conceived in economic theory takes precedence over these "human factors" when the goal of maximizing pecuniary gain must remain uppermost; at one extreme is the stable single-family structure area while at the other pole is the transient area of furnished rooms.

It is now possible to evaluate the hypotheses which informed this study at the outset. The first hypothesis concerned what may be called a model succession price cycle; it is in large part invalidated. The price decline which was expected to accompany threat of Negro occupancy did not prove to be universal, nor was the anticipated rise during invasion borne out in all instances.

The second hypothesis, regarding sources of public opinion about Negro occupancy and property value, is substantiated insofar as its objective aspects are concerned: (1) Where an analysis of price by race of buyer was made, it was shown that typical among sales during early invasion were sales to white buyers who paid less than did Negroes at that time; it may be assumed that among the original residents of the area these sales to speculative white buyers contributed to popular impressions regarding effect of Negro invasion upon local real estate prices. (2) Apparent differentials in assessment procedure were uncovered in analyzing property data on each side of Cottage Grove Avenue, a long standing division between white and Negro residence. This is evidence for the contention that assessments in areas affected by race differences are influenced by implicit assumptions of association between race and price depreciation. That these two phenomena do in fact motivate public opinion as has been hypothesized must remain at the level of inference.

The third hypothesis, which maintains that the Negro "family-type" purchaser must make a bad bargain due to price and financing discriminations which result in commitments necessitating overcrowding and consequent deterioration, is supported by evidence that such differentials do exist in practice. However, it is by no means clear that these discriminations are by themselves sufficient to account for the overcrowding which occurs in areas of Negro residence since they converge with a number of other factors such as population pressures and restrictions, socio-economic differentials, educational handicaps, etc.

The analysis of price and selected variables in the areas studied has resulted in the overall conclusion that prevailing price differences between areas are accounted for by differences in use potential, whether in terms of owner-occupancy, income, or speculative buying and selling. This is another way of saying that prices respond to the regulating function of the supply-demand relation or competitive process, a statement which at first glance might be dismissed as an economic platitude. However, there may be some justification for repeating this platitude in the present context. Human ecologists have always accepted

[12] Louis Wirth, "Housing as a Field of Sociological Research," *American Sociological Review*, April 1947, p. 140. In this article Wirth expressed the point of view that research in housing might well concern itself with a number of community problems, including the study of ". . . . methods that might be used for building sound communities in which people of various economic strata and racial and ethnic characteristics can live together amicably. . . . " (p. 141). The beginning of such a residential pattern may exist in some Northern cities; evidence from Minneapolis is reported by Arnold M. Rose, Frank J. Atelsek, and Lawrence R. McDonald, "Neighborhood Reactions to Isolated Negro Residents: An alternative to Invasion and Succession," *American Sociological Review*, October 1953, pp. 497-507.

competition as a basic process accounting for price levels and spatial distributions, but they have often assumed, along with certain partisan groups, that it is possible to make special generalizations about the overall effects of given racial or minority groups. It appears that conclusions regarding the effects of race upon market values are no longer possible, if ever they were, on this level. If it is desired to determine whether such effects do exist, then the competitive process must be spelled out in greater detail, and account must be taken of some largely neglected factors.[13]

[13] The multiplicity of possible effects which a racial group may have upon property values is suggested by Charles Abrams, "The New 'Gresham's Law' of Neighborhoods," *The Appraisal Journal*, July 1951, pp. 324-337. A systematic analysis of empirical studies made to date is called for in this connection.

The ecological and economic processes of competition remain central concepts in the analysis of real estate price changes which accompany the succession cycle. The ends toward which competition is directed are various; the nature of these ends and the characteristics of the social groups which compete for them are fluid quantities which contribute significantly to the determination of price balance. Extent of identification with particular ends and socio-economic composition of groups competing for them are variables which cut across racial and ethnic lines. The complex of social factors which this suggests forms part of a framework within which it may be expected that research touching upon race and property values may fruitfully be pursued.

Mechanics of the Urban Economic Base: The Problem of Base Area Delimitation†

By RICHARD B. ANDREWS*

NUMEROUS technical problems face the planning analyst in executing a study of the economic base of a particular community. Delimiting the geographical scope of his study area is one of the most important and yet, seemingly, most neglected insofar as rigorous definition is concerned.

The crucial importance of thoughtful and precise delimitation lies first of all in the fact that the economic base of a city is by definition made up of the export activities of the community. These activities involve the export of goods, services, and capital to purchasers who are outside the community or come from outside. Similarly, service activities—economic complement of the base—are customarily defined as those transactions involving goods, services, and capital which are purely local in that, in the process of exchange, they do not cross the line which separates the community from the outer economy of state, region, nation, and international markets. It is evident, therefore, that before a meaningful process of identification—which labels activities as basic or service within an urbanized area—can begin, a clear conception must exist as to the means of establishing an economic-geographic demarcation between the producing community and the beginnings of its export market. It is, moreover, impossible to speak of those indispensable data of the base study, total employment, total payrolls, number of firms, total community population, and so forth, without first having reference to the specific geographic sphere of these factors.

The need of delimitation of some kind is encountered in practically all fields of investigation. The process is peculiarly important in investigations into the nature of the urban economy because of the fact that delimitation is, essentially, explicit in the phenomena to be examined. In other words, the terms "export activity" and "local trade" assume that limits have been established.

The present article emphasizes the fact that the delimitation techniques of economic base analysis are highly variant. There is nothing inherently improper in the fact that each analyst takes an individual approach to the problem. However, a substantial question arises as to whether there are right and wrong ways of going about delimitation. It will, therefore, be one objective of this discussion to examine the delimitation techniques that have apparently been used in several prominent economic base studies and to evaluate these techniques with the end in mind of determining whether they have serious flaws or substantial virtues in performing the function that is expected of them. Yet another objective in this testing of the idea-inventory will be to determine the extent to which the techniques examined have general applicability or have utility in only specialized cases.

Finally, this writer will give his views on the feasibility of a standardized delimitation technique, or techniques, to fit broad type-groups of the city. He believes that before the version of the urban economy here under discussion

† This is the last in a subseries of four articles within the larger series on the economic base and concludes a discussion of the technical aspects and problems of base study execution.

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can become a truly efficient planning tool it must be more thoroughly tested. Part of this testing procedure is to be found in broad-scale comparisons among cities. Yet, assuming relatively similar units of measure and identification procedures, no valid comparisons can be made if area delimitation techniques are not reasonably uniform. Inter-city comparisons of strategic ratios such as the ratio of base-to-service activity, the ratio of total employment to total population, and the ratio of base activity to total population could only be made in a very loose manner if their qualitative content and hence the ratios themselves varied in part because of non-standard means of handling area delimitation.

With these remarks as an introduction the discussion will next turn to an inventory and evaluation of current approaches to the problem of area delimitation.

Area Delimitation Techniques

Formal treatment of base area delimitation techniques is almost entirely absent from economic base literature. This is in a large part due to the fact that writing on the subject of the economic base is confined almost exclusively to general reports on the base of a particular community. Unfortunately, the authors of these reports do not devote much space to an explanation of technique. Too often what is said on the subject is confined to a brief footnote or over-condensed appendix remarks. As a result many of the observations made here on specific techniques will be based on deductions from report maps, and on the manner in which data are presented.

A heavy majority of the economic base studies which have been made thus far are concerned with central cities. As a result there is very little material extant which can point the way toward an area delimitation approach for the suburb and satellite city. It will be, therefore, a further objective of this paper to suggest how the beginnings that have been made in area delimitation procedure for other than central city communities may be extended.

Since one of the principal problems is to determine the adequacy of particular delimitation techniques in establishing boundaries for an economic base area a question is naturally raised as to what the proper criteria are for such delimitation procedures. The argument here proposed is that the base area should be viewed as a producing and distributing unit of goods, services, and capital within the economic framework of its region and the nation. It is the economically integrated geographic area which includes the principal factors of production of the basic and service enterprises of the community. Land fits well into this factor approach with the possible qualification of conditions where long distance transmission of power is involved. Capital likewise accommodates to this frame of reference with the exception of capital in the form of funds borrowed from absentee lenders or invested in stock shares by persons from outside the community. Finally, labor as a production factor aids in the setting of base area boundaries through determination of the geographic range of employment pull by base and service activities. This line of reasoning may well suggest to the reader that two areas are being determined, the base and service areas. However, they are from a realistic point of view identical and therefore coterminous in respect to boundaries. Base and service activities combined represent the economic community.[1]

[1] The apparent duality of this approach might become confusing if, for example, when using a productive factor delimitation approach the boundary of the area represented by the location of the productive factors of the basic activities was *within* the line established by the outposts of the productive factors of the service activities. The outer boundary would, with the exception of certain circumstances to be noted later, be the boundary of the economic community for both service and base identification purposes.

Emphasis must also be placed on the idea of integration and interdependence of productive activities. Interdependence within the economic community can be said to mark in a rough manner the outer limits of the economic community.

It is maintained, therefore, that delimitation factors which support the conceptions outlined in the preceding paragraphs are the proper ones from a theoretical point of view. The base area is, of course, also a social as well as an economic conception but the selection of social delimitation factors should be consonant with the guiding economic approach. If, for example, the boundaries of the base area as determined by relatively "pure" economic criteria are inside boundaries set by equally pure social criteria the economic boundaries should be the ones chosen for economic base area studies.

Criteria for the delineation of urban economic areas must, however, be stated more specifically than has been the case thus far. One of the earliest and yet most complete statements on the subject was made in 1922 by Professor N. S. B. Gras.[2] He looked upon criteria in terms of *tests* of metropolitan district limits. These tests assumed the following general forms:

(1) The point where systems of transportation begin to veer off toward other metropolitan centers.
(2) The radius served by the metropolitan press and other advertising media.
(3) The dependence of outlying financial institutions on the center for clearances and reserves.
(4) Whether it is the center from which the retailers in a border-line town direct their supplies.
(5) Whether the borderline town is independent or dependent upon the center for many of the following functions: (a) storage for the convenience of consumer, retailer, wholesaler, manufacturer, shipper; (b) whether the outlying producer markets directly to the local consumer or through the metropolitan machinery; (c) whether a border-line community communicates by rail, telephone, etc., through the center or independently of it; (d) where the border-line town sends its surplus products for disposal or storage; (e) whether a firm or industry which boasts its independence in some one respect, e.g., the marketing of its wares, is or is not dependent upon the center for its supplies and finances; and (f) whether the border-line town is too far away to avail itself of the central assemblage of museums, theater, libraries, institutions of learning, and where it looks for guidance in fashions, tastes and amusements.

These tests point up rather neatly the element in delineation procedure of interdependence, both economic and social. However, some of the tests would yield an area broader than an economic base area should properly be. For example, the wholesaling function might be most accurately viewed as a part of the community base but if its outer contact points are used as community boundary markers it thereby becomes a service activity. Clearance and reserve activity would also tend to yield areas of great size. Moreover, as a criterion it would apply to only the largest cities and would, therefore, not have general utility. However, most of the elements of test 5 in the preceding list would be more generally applicable. In short, it is necessary apparently to distinguish carefully between an economic-metropolitan and a regional approach.

At the time Professor Gras wrote, similar methods of procedure for defining metropolitan districts had been worked out in detail by the Civic Development Department of the United States Cham-

[2] Thomas Adams, *Regional Survey of New York and Environs* Vol. II, *Population, Land Values, and Government* (New York: Committee on Regional Plan of New York and Its Environs, 1929) Part III, Chapter I, p. 201.

ber of Commerce. In general, the indicators employed were somewhat more restrictive over the size of the geographical areas that resulted. For example, great stress was placed on areas served by telephone service from the central city; on power and light service areas; on retail store delivery; on city water supply districts; and on the commuting area.[3] Only the last could be said to be sufficiently broad in concept to attain the full scope necessary to a productive factor delineation approach. While the tests of Gras were in many cases too broad, those just mentioned with the exception of commuting are too narrow for meaningful application in a large number of cases.

The Legal City

The economic city defined in terms of the legal boundaries of that city is undoubtedly the simplest approach to the problem under discussion. However, the inaccuracy of this approach, particularly for economic base work, has been acknowledged for a very long time. Acceptance of such an approach is feasible in perhaps only two general situations. If time is short and funds for the collection of needed statistics are limited, mitigating circumstances are obviously present. There is also the extremely rare instance in which the incorporation boundaries are so extensive that they actually embrace both the economic and political city. Where suburban communities are being subjected to base analysis incorporation boundaries may frequently be appropriate base area limits particularly in those cases where the suburb is contiguous to another suburb or is an enclave.

The main concern of the current discussion, however, is with geographic-economic concepts and definitions that are far broader in scope than that ordinarily conceived in the incorporated city unit.

The Industrial Area

There have developed over the years two concepts which, under the main design-impetus of the Bureau of the Census, carry in them many of the elements necessary to a sound technique of base area delineation. These concepts are the industrial area and the labor market area—sometimes referred to as the employment security area. They have been used singly and in combination with other devices to delineate base areas in many studies, notably those made in Detroit and Philadelphia.[4]

The concept of the industrial area is best described in the definition given by the Bureau of the Census:

> ". . . Census of Manufacturers statistics have been tabulated for the standard metropolitan areas having 40,000 or more manufacturing employees in 1947. The standard metropolitan areas replace the industrial areas shown in earlier censuses. Industrial areas defined in previous years were groups of contiguous counties having large numbers of manufacturing wage earners."[5]

From the above definition the virtues and limitations of the industrial area approach for base area delineation purposes are apparent.

One feature of the industrial area concept that is quite important to the base approach is that it places geographic emphasis on a factor of production—manufacturing labor force. This approach is nonetheless highly restricted in that it is focused on only one segment of the labor force and is, by the necessities of Bureau of the Census operations,

[3] *Ibid.*, pp. 201-202.

[4] Detroit City Plan Commission, *Economic Base of Detroit* (City of Detroit: 1944.)
Philadelphia City Planning Commission, *Economic Base Study of the Philadelphia Area*, Planning Study No. 2 (City of Philadelphia, August 1949).

[5] U. S. Bureau of the Census, *Census of Manufactures: 1947*, Volume I, General Summary (Washington, D. C.: 1948) p. 13.

further restricted to areas of a certain minimum size.

There is, however, one observation made in the Detroit report which further highlights the economic unit character of the industrial area. The study points out:

> "This area [a three county industrial area] forms an economic unit in which conditions and trends are relatively uniform . . . the Detroit area comprises a single interdependent economic unit. Trends in employment in Dearborn or Hamtramck affect Detroit's population just as much as do employment trends within the city itself."[6]

Here, succinctly highlighted, is the criterion of high interdependence and, hence, function as a single economic unit which should be a vital part of the concept of the base area.

The limits set by a straight industrial area approach (disregarding for the moment its current inclusion in the standard metropolitan area) must, however, be of a rather arbitrary quantitative nature. This situation contrasts with a more flexible conceptual approach along the lines of the labor market area technique which will be discussed next. In short, the industrial area while it has utility in solving the base area delineation problem cannot stand alone as a solution because it is found wanting in relation to two criteria of a sound delineation technique. These criteria are general applicability (1) to all base phenomena and (2) to communities of all sizes and metropolitan-geographic types.

The Labor Market Area

The United States Department of Labor's concept of the labor market and the employment security area is without doubt the most complete and rigorously worked out of its kind. As in the case of the industrial area the labor market area has been used singly and in combination with other concepts to arrive at an urban economic base area.

The labor market area as defined by the War Manpower Commission in 1945 took the following form:

> "A labor market area, for purposes of classification and labor market analysis, consists of a geographical area surrounding a central city (or cities which are only a few miles apart), in which there is a concentration of urban economic activity, or urban labor demand, and in which workers can change jobs without changing their residences. The extent of this area is usually limited by local transportation and commuting facilities. A radius of 20 to 30 miles from the center of economic activity (usually equivalent to an hour or an hour and a half traveling time each way), is considered a normal maximum commuting range."[7]

A specific application of this approach is well exemplified in the study, *Economic Survey of the Terre Haute Area*:

> "A study of the commuting patterns of workers employed by various industrial firms, made by the Employment Security Division in March and April of 1950, showed that most of the workers in Terre Haute resided in Vigo County, but 2.8 percent commuted from Sullivan County, 3.6 percent from Clay, 0.7 from Parke, and 2.6 percent from Vermillion County. Only 0.5 percent crossed the Indiana-Illinois line to work in Terre Haute: presumably most of these came from communities to the southwest of Terre Haute along the main highway (U. S. 40).
>
> "Although the results of this study do not demonstrate that Terre Haute is drawing heavily on out-of-county residents for its labor needs, it does show that there is some interdependence of these counties. Presumably additional labor requirements in Terre Haute would increase the amount of commuting, and decrease the existing degree of self-sufficiency of the local labor market. According to local information there is a sizeable movement of workers out

[6] Detroit City Plan Commission, *Economic Base of Detroit*, p. 2.

[7] War Manpower Commission, Reports and Analysis Service, *Directory of Important Labor Market Areas* (U. S. Government Printing Office: Washington, D. C., May 1945) introductory statement, no page number.

of Terre Haute on workdays, but this is said to be mainly to coal mines and brick plants within a 15-20 mile radius."[8]

In the Philadelphia base study, population estimates are made for several types of "trading areas." These areas included, in addition to the traditional retail trading area, the industrial area and the labor market area. The industrial area employed was the Census concept which is known as the Philadelphia-Camden Industrial Area. The Philadelphia Labor Market Area is bounded by the limits of general home-to-work commuting in the industrial area. The important point to note in this connection is that the labor market area and industrial area are not coterminous. The industrial area includes a combination of eight complete counties in Pennsylvania and New Jersey, whereas the labor market area defined on the basis of a "commuting area" embraces only one complete county and portions of the remaining seven.[9]

The strength of the labor market approach in economic base area delineation work lies in the fact that it is generally adaptable to all types of communities and bases while the statistical materials required are not extremely difficult to collect. There is also an appeal of precision to the labor market area technique. Reference is here made to the fact that, at least in the case of the Philadelphia study, outer limits of the labor market area are set in terms of minor civil division boundaries rather than complete counties as with the industrial area. Whereas the labor market area often deals in complete counties as it did in the Terre Haute report, it can also go down to finer geographical distinctions such as boroughs, districts, and precincts.

On the other hand the Terre Haute report raises a substantial question concerning the reliability of labor market boundaries which are defined on a less than county basis. The disturbing thought here is that in times of prosperity and boom the commuting range may well be extended to points not previously included in the base area. Conversely, depression may contract commuting well within the limits established during better times. This would seem to suggest that, whereas the county is a cruder delineation device, it can better absorb the fluctuations of national, regional, and local industrial welfare cycles and thus circumvent adjustments of base area boundaries that might otherwise be felt necessary. There is, in addition, the rather well-founded impression that the setting of boundaries for the producing economic community is not a procedure where great precision is possible and that, consequently, no serious distortions of the export relations of the community would result from the use of complete county units.

The County as a Base Area Unit

The county as an arbitrary measuring unit of the base area has long been employed, occasionally on an independent basis, but more often as a unit in some larger area conception such as the industrial area. Early studies which were concerned with the economic city employed the county as a unit in a broad regional approach. An approach such as this was used in *The Economic Status of the New York Metropolitan Region in 1944.* Here the New York Metropolitan Region was conceived as an area composed of twenty-two counties in three states surrounding the Port of New York. In this report great emphasis was placed on the idea of the region as an economic unit

[8] Indiana Economic Council *Economic Survey of the Terre Haute Area,* [Part I (State of Indiana: Indianapolis, July 1951) p. 9.

[9] Philadelphia City Planning Commission, *Economic Base Study of the Philadelphia Area,* p. viii.

from which basic and service urban economic relationships might be computed.[10] The original delineation was made in connection with the first New York regional study which appeared in 1929.[11] At the present time there is considerable doubt as to the advisability of using a regional congeries of counties as a base area. This doubt is traceable to the fact that the region as conceived at that time is broader in scope than the economic city. This impression is demonstrated in part by the fact that the industrial area of New York is represented by only 12 of the total of 22 counties in the region. However, the industrial area contained 89.5 percent of the 1940 population and 88.7 percent of the industrial wage earners of the Region in 1939. Further substantiation of the individuality of the regional conception is found in statements made by the architects of the New York Regional Survey itself. Thomas Adams points out:

> "The metropolitan district . . . . is generally smaller than the area which it is necessary to consider when preparing a regional plan. The latter needs to include in addition (to the criteria of the metropolitan district): the water supply reservations of the principal cities; the contributory market garden areas; tracts of land suitable for large state or regional parks; and the land included in communities which are tributary to the metropolis. . . . . "[12]

The single county as base area has been employed with great frequency in the past decade by relatively small cities such as Albuquerque, New Mexico. In this case the observation was made that from an economic point of view Albuquerque is synonymous with Bernalillo County inasmuch as 95 percent of the (county) population lives in and finds employment in the urban area.[13] The trend toward general acceptance of the county (or counties) as the base area unit gained strength between the 1940 and 1950 censuses in large part due to the fact that statistical data related to the base as well as to other problems of an urban character are rendered on a county basis. Note the county unit reporting of housing, population, manufacturing, and business. This entire line of thought gives rise to a brief examination and evaluation of the metropolitan area approach and, in particular, its Census version.

The Metropolitan Concept

One of the most familiar geo-economic views of the modern city and oldest in terms of ideas associated with the urban economic base is that of the metropolitan district or area. So familiar is this concept from the voluminous writings of urban sociologists, urban geographers, and the United States Census that extensive explanatory comment is unnecessary. The metropolitan area concept of the sociologist is based on social contacts of commuting, visiting, shopping, newspaper circulation, radio listening, television viewing, and patronage of central cultural activities. The geographer's concept, on the other hand, tends to be somewhat more limited in its physical extent. For example, the 1940 Census looked upon the limits of the metropolitan district as lines determined by peripheral minor civil divisions whose population density was not less than 150 persons per square mile assuming a central city core of not less than 50,000 persons.

[10] The Regional Plan Association, Inc., *The Economic Status of the New York Metropolitan Region in 1944* (New York: 1944), pp. vii-viii.

[11] T. Adams, *Regional Survey of New York and Environs* (New York: 1929).

[12] T. Adams, *Regional Survey of New York and Environs*, Vol. II, p. 202.

[13] Federal Reserve Bank of Kansas City and Bureau of Business Research, University of New Mexico, *The Economy of Albuquerque, New Mexico* (Albuquerque, New Mexico: 1949) p. 2.

The current Bureau of the Census version of the metropolitan area gives every indication of being the closest approximation to the theoretical ideal concept of an economic base area that it is practically possible to attain. Excerpts direct from the Census will best give a concise description of what is to many already a familiar area delineation procedure.

". . . . The general concept applied was that an area should be an integrated economic and social entity, with an attendant large volume of daily travel and communication between the central city and the outlying parts of the area . . . . The following principles were used in applying this general concept to the definition of individual areas:

(a) Each standard metropolitan area must include at least one city of 50,000 or more; the area as a whole must have a total population of at least 100,000. Areas may cross state lines.

(b) Where two cities of 50,000 or over are within 20 miles of each other, they will ordinarily be included in the same area.

(c) Each county included in a Standard Metropolitan Area must have either 10,000 non-agricultural workers or 10 percent of the non-agricultural workers in the area, or more than one half of the county's population must have been included in the 'metropolitan district' as defined by The Bureau of the Census.[14] In addition, non-agricultural workers must constitute at least two-thirds of the total employed labor force of the county.

(d) Each peripheral county included in a Standard Metropolitan Area must be economically and socially integrated with the central counties of the area. A peripheral county has been regarded as integrated (1) if 15 percent of the workers living in the county work in the central county of the area, or (2) if 25 percent of those working in the county live in the central county of the area, or (3) if telephone calls from the county to the central county of the area average 4 or more toll calls per subscriber per month.

"These criteria were selected largely because investigation indicated that they were the only measure of integration on which usable data might be obtained for a substantial proportion of the problem area under consideration. Preliminary field investigation indicated that comparative statistics measuring the proportion of dollars spent at retail in the central city by inhabitants of the peripheral counties or the proportion of bank deposits held in the central city by individuals and businesses in the peripheral counties, were impossible to obtain . . . .

"The requirement that each area consist of county units sometimes results in the inclusion in a standard metropolitan area of a considerable amount of territory which would not ordinarily be considered 'metropolitan,' much less 'industrial.' It is recognized that metropolitan areas could be more accurately defined in terms of minor civil divisions, but the value of areas so defined is limited by the fact that most types of economic and social data are available only on a county basis."[15]

On the positive side there is much to be said for the standard metropolitan area as an appropriate device for delineation of base areas. The definition of the metropolitan area is based on interdependent economic productive factors with the main emphasis on labor location and movement. Commutation movement is, in this version, calculated on a two-way flow basis so that producing units outside the central city are given adequate consideration. It is also important to note that the delineation procedure throws heavy emphasis on *daily* contact relationships, an important indicator of economic interdependence. Contact is, moreover, measured not only in terms of physical commutation movement but also in terms of communication based on a frequency factor.

Another general advantage of the standard metropolitan area approach is the fact that in principle it is adaptable to any geographically independent urban community and to any variety of base within such a community. To this com-

[14] Contiguous minor civil divisions with a population density of 150 or more per square mile.

[15] U. S. Bureau of the Census, *Census of Population, 1950.*

bination of advantages must, of course, be added the idea of the county-unit approach which increases the availability of pertinent data necessary to most base studies. In this same connection the the point should also be made that when independent checks are made of relative volumes of business done by firms between the local and outside market these are in most cases far easier to estimate and compute in terms of county boundaries than in terms of the boundaries of minor civil divisions.

Finally, it may be said that the "respectability" of the standard area is very great. This is due first of all to the thorough fashion in which it adapts to the needs of a suitable base area definition. There is also present the idea that the standard area is the product of many years of thought and research on the part of a highly competent technical government bureau. These factors represent strong bids for the general acceptance of this area concept for base area description purposes for the time being.

However, there are points, though few, on the negative side of the argument. There is, for example, the objection that the standard metropolitan area has fixed population minimums and does not, therefore, pertain to cities below the minimum size level. This is, of course, not a damaging criticism since the population limits might easily be removed and the basic principles of delineation on a proportional basis would still remain for the most part. However, in the case of metropolitan-area suburbs under economic base analysis, even the proportional technique might not be entirely appropriate. Criticism might be raised as to the commutation proportions adopted. In a situation such as this, arbitrary limits must be set. Obviously, the proportions cannot decline to a base of 1 percent or zero for, below a point, economic integration may become too weak to be significant. Only those persons and authorities such as the Bureau of the Census who have long familiarity with such problems are in a position to render competent judgment as to appropriate limits and cut-off points. Finally, a question may arise concerning the county-unit, or its equivalent, as the most suitable building block for a base area. As was pointed out a few paragraphs back, and as the Census Bureau itself admits, the county is often unwieldly and imprecise for metropolitan area delineation purposes. Whereas these objections were met in part by the exigencies of data collection and the practical difficulty of introducing a high degree of precision into delineation work of this kind there does remain a bothersome question of the very small city in the very large county. Certainly, the small trading center cannot view the county in which it is located as its base area when a true economic evaluation of the situation indicates that practically all of the county represents the export market for that particular city.

Conclusions

Any thorough-going discussion of economic base areas and the manner of their description has at least two general goals in mind. One of these goals is a type of description or delineation that will best reveal the urban community as an economic and social entity whose mechanism of productive and distributive parts is interdependent to a very high degree. Subsidiary to this goal are such technical objectives as general applicability of a description system to community types and to base types. This second goal is concerned with the standardization of conception of an economic base area in order to increase the comparability of base studies and consequently to increase

the reliability of generalizations relative to urban economies that may be drawn from such comparisons.

It is this writer's belief that at the present time those interested in actual field research on problems of the base should employ the Bureau of the Census Standdard Metropolitan Area as the base area wherever this may be possible. This suggestion is made in the belief that the Census has made the closest practical approach to the goals mentioned above. While this may seem to many an obvious and over-simplified conclusion it is one that has to be stated for the sake of much needed emphasis. There has been a definite tendency for those cities which are large enough to qualify as standard areas to use this approach for base analysis. Others have employed independent techniques of delineation or combinations of independent and standard area approaches. Acceptance of the Census approach does not suggest that a standard has triumphed for all time. Quite the contrary, the standard approach must be subjected to constant testing and questioning. This becomes doubly necessary in a dynamic society where seemingly trivial technological devices and institutional developments can undermine what appear to be impregnable concepts. In this same connection it is appropriate to emphasize the idea that since the Census is on a one-analysis decennial basis it may describe the base area at a cycle phase which is highly atypical. This may mean that for base-area-analysis purposes a typical economic year or years within a decade should be selected for application of the standard area approach.

Adoption of the standard metropolitan area as base area leaves at least two disconcerting loose ends that must receive attention here. These problems are represented, first by the city which though geographically independent is too small to be considered as the core of a standard (county) area and second, suburban communities which are lacking both in size and geographical independence yet may require base analysis.

In the first case, that of the small independent city, one might say that as long as the city and area size closely approximate the standard area population minimum the Census technique might appropriately be used. But the reliability of the county unit measure of the standard area concept is very likely to diminish with great rapidity as city size declines. It is therefore suggested that where city size is substantially below standard minimum the old minor civil division approach be used for the independent city. This variation would involve an application of the standard area measurement proportions (not the *absolute* measures, with the exception of density) to the minor civil divisions rather than to counties.[16] Naturally there would be a loss sustained to such studies in the absence of county-data integration with base-area data. But a decided gain would be registered in the fact that the less-than-county area would far more accurately represent the community's base area. In this type of analysis it is not recommended that a return be made to the old 150 persons per square mile criterion which was used as a qualified standard approach for New England where towns rather than counties are the area units. Integration, economic and social, in combination (or alternating) with the density measure still appears the soundest test of base area extent. One conspicuous circumstance in which the ordinary integration tests would break

[16] Unlike the standard metropolitan area concept this approach would not assume contiguity of minor civil divisions with one another and the central incorporated core. Gaps might well exist with degree of integration standing as the test of inclusion or exclusion of peripheral divisions.

down would be one in which the town or minor civil division was populated principally by persons on retirement incomes. It is felt, however, that this is such a specialized situation that it would be immediately recognized by the base area analyst and the civil division would consequently be included in the base area despite weak performances under regular communication tests.

One final difficulty of base area delineation which is not met by the standard area approach is that encountered where a metropolitan area suburb is subjected to base analysis. As was mentioned in an early section of this paper, one possible solution to this problem is an interpretation of the base area in terms of municipal boundaries. This approach would assume that all areas beyond the boundaries were those of another suburb or, if not incorporated, part of the central city's economic area. This does not seem to be a completely reliable conception, in large part because many suburbs have an independent pull or radius of dominance within the larger economic area. Consequently, it is here proposed that a better approach to the problem is one in which the base area of the suburb is determined by: (a) incorporation boundaries at those points where the suburb is contiguous with other incorporations; (b) standard metropolitan area integration proportions where the suburb touches unincorporated minor civil divisions.

Where analysis of the components of twin or multiple cities is desired the above approach is also feasible. However, the standard area approach may also apply in these cases in the event that incorporation boundaries are not contiguous. This point was emphasized in a recent article which said:

> "A more difficult and more frequently met problem was that of competing cities. In the past, metropolitan cities in adjoining counties were in numerous cases included together in one hyphenated metropolitan district, as, for example, Scranton-Wilkes-Barre. In defining the new metropolitan areas these combinations as well as others were examined to determine whether integration existed, using the same principles followed for peripheral counties. Integration was demonstrated to be lacking for the following centers which previously had been combined: Scranton and Wilkes-Barre, Boston and Brockton, Lowell and Lawrence and Haverhill, ... and Racine and Kenosha."[17]

These comments on urban economic geography have intruded into a field which is not the specialty of this writer. However, it is hoped that the problems and their suggested solutions have not been too simply stated and that they will contribute to the comprehension and manageability of a far broader concept, that of the urban economic base.[18]

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[17] Robert C. Klove, "The Definition of Standard Metropolitan Areas," *Economic Geography*, April 1952, p. 102.

[18] While this paper was in galley proof Professor Harold Mayer of The University of Chicago, published an article on this same subject of base area delimitation. (Harold M. Mayer, "Urban Nodality and the Economic Base," *Journal of the American Institute of Planners*, Summer 1954, pp. 117-121.) The discussion is a contribution to the Chicago Region Project of the Department of Geography of The University of Chicago which is studying the reciprocal relationship between Chicago and its region, from the region inward. In line with this approach Mayer makes some very provocative observations concerning the base area-concept in terms of the relation of transport routes and traffic to a hierarchy of interrelated urban nodes. The "continuous hinterland," "gateway cities," "interchange areas," and "traffic watersheds" represent the detail focus of this approach.

City Planning, Administration—and Politics†

By CHARLES S. ASCHER*

THE present pattern of organization for local public planning in the United States was set in the 1920's. It is hard to realize that this was a generation ago! The subject of concern had been defined by Edward Bassett. It was the elements of the "master plan." These elements were the subjects of public action: streets, sewers, docks, schools. Beside the master plan, the tools of the community planner were to be zoning, subdivision control, the protection of mapped streets. The standard state enabling act that would put these tools in the hands of local planners was largely shaped by the legal genius of Edward Bassett and Alfred Bettman and given impetus by Herbert Hoover as Secretary of Commerce.

Looking back on Mr. Bassett, the acknowledged father of zoning, I have sometimes been puzzled to understand the motives that urged him to leadership in imposing this form of statism, from the days of the New York City Club's Committee on the Height of Buildings that paved the way for the Zoning Resolution of 1916. In personal contact he seemed in other respects a most conservative gentleman, mainly occupied professionally as an attorney for mortgage-lenders; and, to judge by a reading of his (privately printed) diary, not the adventurous type.

Mr. Bettman was a leader in civic reform, not only in planning but in criminal law (the Wickersham Commission report) and local government (the Charter Party in Cincinnati). Bettman was a man of courage and a lovable liberal. Yet he could be curiously doctrinaire, to the point of unrealism. For example, he could assert at a national gathering that, under council-manager government, the council made policy and the manager, "if he is the kind of manager that the theory of manager government assumes, administers."[1]

This neat division of responsibility certainly did not exist in the Cincinnati of Colonel Sherrill or Clarence Dykstra. Yet Bettman, who had helped to bring this form of government to Cincinnati, could make this abstract statement, although he must have seen daily, in his own official life as chairman of the Cincinnati City Planning Commission, evidence of its inapplicability.[2]

It was under the leadership of Bettman and Bassett as draftsmen that the standard pattern of organization for local planning took form. That pattern was the appointive volunteer citizen planning board, a pattern familiar in local government in the decades in which their thinking was formed. Indeed the official "independent," "non-partisan" board seems one of three recognizable steps in the natural history of the undertaking of

† This article is based upon talks by the author before planning students at the Graduate School of Design at Harvard University and in the School of Architecture of Columbia University and before the New Jersey Society of Architects.

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[1] American Society of Planning Officials, *Proceedings, Conference on Planning Problems and Administration, January 18-19, 1940* (Chicago: The Society, 1940), p. 9.

[2] As for the "theory," see the conclusions of the most elaborate survey of council-manager government ever made, Harold A. Stone, Don K. Price and Kathryn H. Stone, *City Manager Government in the United States: a Review after Twenty-Five Years* (Chicago: Public Administration Service, 1940): "It is generally impossible for a city manager to escape being a leader in matters of policy, for it is an essential part of his administrative job to make recommendations." (p. 243). "To ask a city manager to avoid incursions into policy would be to set up an impossible distinction between policy and administration; it would be, in effect, to ask him not to be a city manager." (p. 247).

many new services and activities by local government in this country.

The first step—voluntary citizen action—has often been the lengthened shadow of one man. Clifford Beers, out of his own two years in a mental institution, wrote *The Mind that Found Itself*, founded the National Association for Mental Hygiene, and revolutionized American thinking and action about the care of the mentally ill. Nathan Straus, the merchant prince, set up centers for the free distribution of pasteurized milk in the tenement districts of New York and demonstrated that fewer babies died. It is one of the quiet revolutions of the last thirty years that there are few parts of this country today where unpasteurized milk can be distributed commercially.

Joseph Lee, a charming gentleman of fine Boston family, a graduate of the Harvard Law School who preferred to dedicate himself to civic purpose, founded the Playground and Recreation Association of America in 1906. His program was to persuade the wealthy to make private charitable contributions to provide playspace in the slums. In his own life-time he saw this movement pass through two stages. It next became an object of public action through recreation commissions or park boards. Within a generation it became a normal function of local government, almost universally administered by a regular municipal department. Lemuel Shattuck, "our first public health statesman, was not a doctor, but a teacher-historian-publisher-businessman-statistician-legislator."[3]

It was in the same climate and spirit that a railroad president named Delano and a banker named Norton, as members of a private club of civic leaders in Chicago, hired an architect named Burnham to make the landmark study for a Plan for Chicago. These same two citizens, when their work took them to New York, persuaded a private philanthropic foundation to finance the monumental Regional Survey of New York and Its Environs.

The next stage in our natural history comes when the lay citizens who have fought and bled for recognition of the importance of their social service finally persuade the governmental authorities that it is a proper sphere for public action. At this moment, the emotionally charged promoters view with fright the possibility that the subject of their dreams will be mutilated by the crass politicos at City Hall who don't understand the true inwardness of the cause. So the first proposal is to set up a library board, a recreation commission, through which the truly enlightened make sure that things are done properly. In many instances, the city fathers, having been reluctantly pressed to see that something was done, are undoubtedly content to let a group of citizens relieve them of thinking through what to do.

Yet somehow, things don't always work out as the eager citizens hope. The best people will serve on the new board while it has the fresh and creative impetus of pioneering; but it is tiresome after a while to meet month after month to decide routine details of operation. As the veterans grow old and retire, it becomes harder to find a second generation of leaders equally fired to give the time to serve, who never stormed the battlements in the first attack.

Furthermore, after a time the independent board loses in the competition for attention of the officials who carry the ultimate broad responsibility for government. Later city fathers have new headaches; the access of the civic leaders on

[3] Harry N. Rosenfield, "Experts Are Never Right," *The Antioch Review*, Spring 1949. Mr. Rosenfield develops intriguingly the thesis that in every field of social action, it was the layman, not the professional, who sparked reform.

the commission to the policymakers is gradually closed off.

The third step in evolution then comes about naturally. Recreation, hospitals, become departments of city government, headed by a member of the Mayor's cabinet, regularly involved in the process of making the executive budget, calling upon the normal auxiliary services of the city for help.

One can trace many of these same forces in the evolution of local public planning. Professional planners, too, have a pure passion to protect the integrity of their long-term plan. There must be a way to preserve it from disruption and compromise. Able men have worried about this problem. Rexford Tugwell, as first effective chairman of the New York City Planning Commission,[4] set the Commission off with a wide vista of thought about the basic economics that would determine the future of the City. He expressed his worry in an essay, "The Fourth Power,"[5] in which the economist, turned political philosopher, posited planning as a higher power, independent of the previously recognized executive, judicial and legislative (or as Herblock says it should now be called, the investigative.)

At about the same time, Lewis Mumford, lecturing at the University of Hawaii, was asked to prepare a report for the Honolulu Park Board. He presented a brillian distillation of *The Culture of Cities*, demonstrating that the parks of Honolulu could not be planned without reference to the slums or, indeed, to the future of the whole city. A Charter Revision Commission was then at work in Honolulu, so Mumford added some thoughts to guide them on preserving the integrity of the plan. His idea was to appoint a planning director with a term of office longer than that of any elected official, who would have final authority over the expenditure of public funds for capital improvements. It seems impossible to reconcile this proposal with the basic expectations of Anglo-American local government: that elected representatives of the people hold the power of the purse, so that we can throw them out and elect someone else if we don't like the way they spend our money. Indeed, when put to it, Mumford was not able to bring his proposal under these assumptions.

In the same report, Mumford was impelled by a current exemplar to praise the union of planning and action:

> "Such commissions tend to suffer from the lack of an indispensable element: a dominant personality of marked administrative or designing talent, capable of fusing together in a common design the special projects needed, anticipating future developments, making ready for them, installing them successfully, making them intelligible and useful to the community at large. Most of the effective planning in New York during the past five years has been due to the existence of such a personality as head of the park system. Wherever one encounters the highest type of planning work, one discovers such a personality, such a mind at the head of it."

Mumford's Honolulu Park Report was printed in 1938 in the Islands and few copies came to the mainland. About seven years later, it was reprinted in his sheaf of essays over twenty years, which, in a gesture of piety to Patrick Geddes, Mumford entitled, *City Development*. In the reprint, there is a footnote to the passage quoted above:

> "This appreciation of much of Mr. Moses' early work I would not withdraw; but in

[4] Tugwell is so generally remembered as the first chairman, that it becomes almost a historical duty to recall that Mayor LaGuardia first appointed Adolph A. Berle, Jr. in a holding action until a Tugwell could be found.

[5] Rexford G. Tugwell, "The Fourth Power." a paper delivered in Washington, D. C. on January 27, 1939 at a dinner sponsored jointly by the American Institute of Planners and the American Planning and Civic Association. *Planning and Civic Comment*, April-June, 1939, pt. 2, entire issue. 31 pp. Vol. 5, (no. 2).

> view of inability to tolerate, still less profit by criticism, I would now be inclined to throw safeguards around such a personality by giving the popular educational body, suggested later, a more positive political function, in a resolute effort to check the aberrations to which the will-to-power is always subject."[6]

We see, then, how economists and philosophers, profoundly concerned about planning, seem to lose their foothold in thinking how to prepare and to assure the perpetuation of the plan. In a time of different emotional temperature, a student of government could, in a coldly scientific way, call these proposals subversive!

The pattern of organization of local planning standardized in the twenties was subjected to a thorough-going field inspection and review in the late thirties by a well-schooled young observer. The book that reported his visits to thirty-seven cities has become a standard work, *The Planning Function in Urban Government.*[7] Robert Walker went to the cities famous for issuing the most glamorous planning reports, accordingly reputed to be doing the most effective planning. Yet the evidence in the book seems to support Walker's conclusion that the efforts of independent planning commissions in these cities had produced few results in the previous decades.

Walker applied to his analysis of the planning function in local government a calculus that had just been put before the American people with the authority of the President of the United States behind it. Franklin D. Roosevelt asked three leading students and practitioners of public administration to suggest how he could organize himself better to carry out more effectively his role as Chief Executive. His Committee on Administrative Management—Brownlow, Merriam, and Gulick—deliberately held their reply to less than fifty pages, outlining general principles briefly and vivaciously enough to tempt a Congressman to read it. Though the public impact of their analysis was fresh, there lay behind it twenty-five years of administrative research and experience.

The Brownlow Committee report proposed that a main role of the Chief Executive was to keep all the threads tight in the web of administration—a task for which the horrid name is "coordination." This responsibility he could not delegate, but he needed personal aides and advisers to help him to wield the three main tools of coordination: control of expenditures, through the budget; control of personnel practices; and planning.

Walker was the first to analyze planning in local government by these propositions about organization and administration. And the independent volunteer commission did not fit. No part-time board of nine could function as an aide to the Executive. (The history of the National Resources Planning Board demonstrated that even a committee of three could not establish the relation of confidence with the President that his budget director developed.)

A voice will be heard at this point to urge that the local planning board seems as much related to the city council as to the "chief executive:" can the principles of the Brownlow Committee report be applied? The answer will seem different for varying patterns of city government. Under the "weak mayor" form, it is hard to identify a chief executive. If a city department head has difficulty in maintaining effective, responsible relationships with the council or a committee of council, a planning board (an-

[6] Lewis Mumford, *City Development: Studies in Disintegration and Renewal*, "Report on Honolulu," p. 139. (New York: Harcourt, Brace & Co., 1945).

[7] Robert A. Walker, *The Planning Function in Urban Government* (Chicago: University of Chicago Press, 1941; revised edition, 1950).

other committee) will find these difficulties accentuated. In either the "strong-mayor" or "council-manager" patterns, there is an identifiable executive whom the planner can serve as an aide. The confusion is accentuated because we characteristically ask our municipal councils to intervene in actions that seem more truly executive than legislative. For example, it is hard to see that the opening or closing of a street is not properly an executive decision, yet, traditionally, we demand a vote of the council to make it legal.

Indeed, in the same rather muddled way we have imposed upon the planning commissions a variety of really executive tasks that have little to do with planning the future of the community: administration of minor adjustments in the zoning map; passing on the curvature of streets in subdivision plats—tasks one step removed from the province of the city engineer. Under a kind of Gresham's Law, these chores drive out the higher forms of planning and come to engross the energies of the plan commission's staff. Los Angeles some years ago revised its charter to relieve the plan commission of the whole business of manipulating the zoning ordinance and put it in the hands of a zoning administrator.

If, then, planning is a tool of the Chief Executive, and not an enshrined idol to be guarded by an "independent" group of vestal virgins, the relationship of the planner to the responsible officials —whether Mayor, Manager, or Council —becomes that of an adviser. Giving advice is not an easy role to maintain spiritually. You know the right answer, and it is frustrating not to be able to make it happen, but only to suggest it to others. Oddly enough, little has been written about the role of the adviser. One of the most perspicacious and sensitive statements is by Lyman Bryson, familiar as the central figure in radio's most sustained appeal to the intellect, "Invitation to Learning," less familiar as an executive of a large public service corporation.[8] Another thoughtful analysis, pitched at the highest levels where advice and public action meet, is Don K. Price's *Government and Science*.[9]

Not only is the planner giving advice; he is serving as an expert. The relationship between the expert and the policy-making official is often misunderstood by both. It is beautifully illustrated by an example offered by the former director of a laboratory conducting research in building materials, Robert Davison. The city council is responsible to the citizens to assure the structural safety of their buildings, so that the next strong wind will not blow down a jerry-built house. If a hurricane bowls over a lot of houses, the councilmen may not be reelected. On the other hand, neither the builders nor the home-buyers will think well of the council if they are burdened with unwarranted expense imposed in the name of safety. If the council passes an "arbitrary" building code, it may be thrown out by the courts—and the councilmen may not be reelected.

The laboratory expert can confidently and scientifically tell the council that a wall, say, of pressed grape-nuts two inches thick will resist a wind pressure of 60 miles an hour; a more expensive three-inch wall will stand up to an 80-mile wind. The council then turns to another expert, the meteorologist, who reports that, in seventy-five years of recorded weather in that city, the wind has blown over 60 miles an hour perhaps five or ten times. Does the council ordain a

[8] Lyman Bryson, "Notes on a Theory of Advice," *Political Science Quarterly*, September 1951, pp. 321-39; reprinted in Robert K. Merton, ed., *Reader in Bureaucracy* (Glencoe, Ill., The Free Press,1952), pp. 202-16.

[9] "The Machinery of Advice," (New York: New York University Press, 1954), Ch. V, pp. 124-59.

two-inch or a three-inch wall? The experts have given the council certain ranges of data which it must balance against other factors. But the councilmen's decision is ultimately not expert—it is political. (Indeed, the council is fortunate if it has not received inconsistent advice from the several experts.)

Once, during the war years, a team of students at the Graduate School of Design at Harvard presented to a seminar in which I was a visiting lecturer the results of a study to solve the traffic problem in Harvard Square. I was prepared to believe that it was a technically sound solution, which would minimize accidents and deaths in that complex pattern of street intersections with vehicular and trolley transportation. Since most young Americans were then in the Armed Forces, this study had been made by a team of foreign students. An essential element of the plan was to convert part of Cambridge Common into a parking lot. I ventured to ask whether any councilman of the City of Cambridge could be expected to vote for something that a large body of citizens would consider a desecration of the spot where General Washington had taken command of the Revolutionary troops, where until recently there had stood the very elm tree under which the hero had stood. I suggested that it was not sound planning to advise officials to do something that would ensure their defeat at the next elections. My suggestion was not well received by the internationally famous designer who presided over the seminar.

I was fortified in my view by the history of Mayor La Guardia's response to the novel powers given to the newly created city planning commission under the New York City Charter of 1938, the drafting of which he had inspired. Under this charter the commission was empowered to put together the capital budget out of the proposals of the city departments. The elected officials could cut items off the list, but could not add items except by an overriding three-quarters vote. Thus the integrity of the plan would be preserved.

However, the Charter draftsmen realized that an appointed body could not have unlimited freedom to commit the city financially, so they provided that the Comptroller should certify the maximum debt that he believed the city should incur for the next year; and the Mayor was to certify to the commission his ceiling amount for the capital budget. When La Guardia realized the import of the planning commission's powers, for some years he sent over annually a certificate setting a ceiling of one dollar. As Mayor, he was not going to have any appointed officials tie his hands on priorities for public improvements. If he could make a deal with WPA or PWA to help finance an airport, he wanted to be free to move.

It may be said that LaGuardia's conduct demonstrated his lack of appreciation for orderly administration, his failure to recognize the role of planning. But LaGuardia saw the issue differently: He had to run for reelection, the planning commission did not. And the citizens applauded when the airport was named LaGuardia Field. We have here an example of what happens when a politically responsible official thinks that experts are put into a position in which they seem to compete for power.

If the planner is an aide to the responsible elected executive, and if one of the chief's main tasks is coordination, then an important way in which the planner can help his chief is to see that all the proposals for civic development generated in the departments of municipal government dovetail and fit together in a coherent pattern. Even

more, the planner, on behalf of his chief, can inspire the departments to more coherent forward thinking. I have been told that the staff of the New York City Planning Commission is performing this role more effectively now than in its earlier years, under the impulsion of its present chairman. Professional planners were not enthusiastic about his appointment; there was nothing in his background to indicate mastery of the art of planning. The chairman was a lawyer, prominent in the American Legion, a former state attorney-general, long active in the Democratic Party in Brooklyn, once candidate for Governor. Out of this experience he learned the wisdom of getting his men out making friends in the city departments, laying the basis for workable adjustments—a useful political art, which the Commission might profittably have practiced more extensively in its earlier years.

Another chapter in the history of the New York Commission is instructive. Chairman Tugwell was asked in the first year how much money he needed to run the Commission. It seemed that he could not usefully spend more than a quarter of a million dollars, what with inevitable delays in organizing and in recruitment. The next year Mr. Tugwell learned over again what he must have known from his experience in Washington: once a level of expenditure has been set, it can be increased by five or ten percent, but normal budget-making processes do not respond with doubled allotments. For a dozen years or more the plan commission continued to operate on about a quarter of a million dollars.

Then, in one year, its budget was nearly trebled! Did this come about because of a sudden conviction in the budget bureau or the Mayor's office that planning was a misunderstood but powerful tool that had long been neglected? Not at all. Mayor O'Dwyer paid off a political debt to his successful campaign manager by appointing him chairman of the planning commission. Professional planners were troubled: the new chairman was a young man in his middle thirties who had published a little weekly tabloid devoted to civil service news. But he was dynamic, he had a reputation to make and he might as well make it as chairman of the planning commission. But what could an ambitious man do on a mere $250,000 a year? He made well publicized statements to the mayor that the commission needed a million a year to do its job. He didn't get the million, but he got nearly $700,000. Jerry Finkelstein may not have been an expert planner, but he was the first chairman of the commission who had a confidential relationship with the Mayor.

If the planner's role is that of adviser to the executive, where is he left if the executive is insensitive to planning? In the course of my official wartime duties, I called upon the mayor of the capital city of a great industrial state to urge him to start plans for veterans' housing. He said that in his city this was the responsibility of private builders. I pointed out that the private builders' houses might raise difficulties for the city if their location was not planned. For example, they might overload the sewers. "In this city, we use a sewer till it backs up, then we figure out what to do next," said the Mayor, terminating the interview. There is no way, by law or otherwise, to compel a man to follow advice. Robert Walker's book is testimony that independent planning commissions, safely outside the vortex of political forces, have not goaded into action mayors and councilmen who were not planning-minded.

There must then be a role for the planner as citizen educator. If the re-

sponsible officials are not sensitive to planning, can't the planner lift them on a ground-swell of popular understanding—and pressure? He can, indeed, if he will resign and serve as director of a citizens planning association. Rexford Tugwell as chairman of the New York City Planning Commission, hailed the organization of a Citizens Planning and Housing Council; he said that he needed such a group not only as supporters, but as critics. But the planner as aide to the executive destroys his basic relationship of confidence if he takes planning to the public outside the terms set by the politically responsible officer. Some years ago the able planning director of a state capital city resigned, in no small measure because the Mayor told him to quit talking before neighborhood meetings about the future highways planned for that area. This seemed to my planner friend not a limitation on his freedom of speech, but upon his legitimate role as a planner. I was not as sympathetic as my friend expected me to be. I recalled that the Mayor had dominated that city for nearly three decades; he evidently thought he was a better judge of the timing of announcements about proposed highways than the planner, thinking no doubt of his next campaign for re-election. The equally able director of a county planning board—who is out talking five nights a week around the county—says that he has never made a statement not within the announced policy of the county executive. This planner once served in a state legislature.

Nine years after the publication of his doctoral thesis, *The Planning Function in Urban Government*, Rober Walker issued a revised edition, with a new chapter of appraisal. In the intervening years he served under a magistral figure in the U. S. Department of Agriculture, William A. Jump;[10] and directed an innovative program of citizenship education for Milton Eisenhower at Kansas State College. His theoretical analysis of 1938 was thus fortified by rich experience when he made this appraisal in 1950:

> ". . . . a tradition and a set of attitudes . . . . that prevent the proper role of a planning agency from being either clearly perceived or acted upon. Among the ob-obstructions . . . . are: (1) too narrow limitation . . . . to zoning, public works, and the strictly physical aspects . . . . (2) use of semi-autonomous citizen boards, many members of which are amateurs in both government and planning; (3) undue emphasis upon marshalling public opinion for particular proposals rather than working closely with elected and appointed public officials; . . . . (5) lack of clear-cut responsibility to the chief executive in the administrative hierarchy, making for uncertain relationships and failure to use the planning agency in over-all policy planning."[11]

And Walker suggests that planners face these alternatives for the future:

> "(1) Planners can recognize the tenuousness of their position (as many of them undoubtedly do at present) and continue to advocate such lines of future development as they think best; (2) they can take refuge in giving attention to problems of relatively slight social or political consequence . . . .; or (3) they can re-orient their efforts in the direction of serving as the confidential adviser and assistant of incumbent officials, letting such parts of their commendations as may appeal to these officials become part of the latter's own policy and program."[12]

A hopeful trend is noted by the International City Managers Association. In an increasing number of council-manager cities, the director of planning is appointed by and responsible to the mana-

[10] See, as one result of this experience, Robert A. Walker "The Relation of Budgeting to Program Planning," *Public Administration Review*, Spring 1944, pp. 97-107.

[11] *The Planning Function in Urban Government* (Chicago: University of Chicago Press, revised edition,1950), p. 363.,

[12] *Ibid.*, p. 367.

ger.[13] The manager also appoints a group of citizens as a planning commission. This same trend marks the changing organization of the parallel personnel service. There we are moving away from the bipartisan commission, which is as ineffective as the non-partisan commission. Increasingly, in state and municipal governments, the chief executive appoints a personnel director to help him administer a creative program of improved personnel relations; the civil service commission becomes a rule-making body and acts quasi-judicially to hear appeals. This pattern has long been familiar in public health services with a health commissioner as departmental head and a board of health to promulgate sanitary regulations.

Another hopeful portent is the Model State and Regional Planning Law promulgated by the National Municipal League in 1954. The motivation is Section 701 of the National Housing Act of 1954, which authorizes federal grants for local planning through state planning agencies. The bill takes advantage of the motivation to recommend organization for state planning. The pattern proposed is a state planning office in the executive office of the governor, headed by a director, with provision for an advisory board to be composed partly of citizens, partly of state department heads. Here is a *parti pris* at the level of state government which the National Municipal League might next apply to a re-examination of the model enabling legislation for local planning.

We need not abolish the standard pattern of municipal planning organization promulgated a generation ago But the way should be opened to apply to local planning what we have learned from the practice and study of administration and politics in the last thirty years. It seems clearer now than then—however unpalatable the statement may be to the scientist-professional—that the role of the local planning officer basically is to give advice to the responsible officials which they are willing to believe will help them to defend their administration at the next election.

[13] A cry of rebellion was voiced in 1953 by a younger planner who resented the planner's subordination to the city manager, and was jealous of the manager's exclusive "immediate and direct" liaison with the Council. William I. Goodman, "The Planner's Relationship with the City Manager," *Journal of the American Institute of Planners*, (Summer 1953) Vol. XIX, No. 3, pp. 147-50. This cry was answered, more systematically and solemnly than in the present essay, jointly by the City Manager and the "Director of the Planning Department" of the City of Medford, Massachusetts, Peter H. Nash and James F. Shurtleff, "Planning as a Staff Function in Urban Management," *Journal of the American Institute of Planners* (Summer 1954) Vol. XX, No. 3, pp. 136-47). The reader is referred to this article for a solid case-report on successful relationships in Medford, well documented to the relevant planning literature.

Fitting Big Dams Into Little Economies

By S. BLAIR HUTCHISON*

Editor's Note. Rather than presenting a separate review of the rather monumental study of the Missouri River Basin Survey Commission, the editors have decided to run the three articles which follow herewith in sequence. These articles deal with some of the major issues that have been considered by the Missouri Valley Survey Basin Commission. The report of the Commission, *Missouri: Land and Water*, is a must for anyone interested in resource development.

OF all the civilian activities engaged in by the federal and state governments of this country, none is more important than water resource development. We are justified in saying this from two points of view. First of all, such projects bring great benefits to both regional and national economies. Secondly, some of the activities related to water resource development are tremendously expensive and a heavy drain on public funds. On the one hand, this country has a compelling reason for harnessing the water resource and, on the other, it has an equally compelling reason for exercising caution and economy in doing so.

In the dam-building phase of water resource development, the benefit-cost ratio has been used as a mechanism for weighing these two considerations. In other words, benefits to arise from the particular dam in the way of power, irrigation, flood control, and improved navigation are added together and compared with the costs of the project. Any project in which benefits would exceed costs enjoys a degree of desirability—the bigger the benefits in relation to the costs the greater the desirability.

The soundness of this type of comparison is obvious. However, the actual evaluation of an individual project is by no means as simple as the idea. The factors to be considered are both numerous and complex, making the appraisal difficult. No one who has had to make comparisons of this sort will deny that there is still something to be learned on the subject. Recent thinking about several big dams in the headwaters of the Columbia River points to one opportunity for improvement. The evaluation and design of big dam projects can be strengthened by taking a broader view of costs than has been the common practice in the past.

Cost of Big Dams

What does a big dam cost? Most people would answer that question by totaling the purchase price of the land to be flooded or otherwise used in connection with the project, the cost of actual construction, and the cost of purchasing or moving or replacing roads, homes, businesses, and other facilities which lie in the reservoir area. Such a tabulation would certainly give an esti-

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mate of the original outlay by the agency assigned to build the dam. However, there is another group of costs, which may be big or small, falling under the general heading of impact costs. When a 200- or 300-million-dollar dam is built across a river you can expect things will be different in that locality from then on. Such a dam is more than an engineering masterpiece. It is also a major alteration in the geography of the locality where it is built. This is particularly true in the headwaters of the major western streams where rugged topography has squeezed the bulk of human activities—homes, industries, farms and travel—into the larger valleys.

To the extent such a dam brings local advantages in addition to power, irrigation, and flood control, these should be credited to the structure. It is even more important to recognize and to measure the adverse impacts upon the local economy for these are costs which can have a bearing on the desirability of the entire project. They are costs which must be very carefully considered if big dams are to be fitted into local economies with the least disruption of people and their livelihood.

The slowly rising waters behind a big dam bring many kinds of impacts. In some cases highly productive land is flooded. Though the owners of this land have been reimbursed and have gone elsewhere, presumably no worse off than before, the community may suffer a real loss due to the reduction and upsetting of its income base. A less generally recognized but perhaps more important impact of reservoirs is the increased difficulty of managing and developing the resources which lie around them. In mountainous country the principal impacts are likely to be of that sort. For example, a recent study[1] showed a big dam proposed on the Kootenai River in northwestern Montana would, under one set of circumstances, add considerably to the cost of managing the Kootenai National Forest. The difficulty of crossing the reservoir would require the operation of one more ranger station than is now necessary. Timber transportation costs from the stump to sawmills, pulpmills, and other plants, would rise even more because removal of the railroad from along the Kootenai River to another location would make it less useful to local industries. A highway would have to be rerouted along a more circuitous route, thus making both road maintenance and public travel more expensive. Also in this particular instance the pay envelopes of a number of workers would be lightened because of a shorter logging season. The reservoir which would be relied upon heavily for timber transportation would be usable only six or seven months a year. Thus, more workers would be required in the summer months, fewer in the winter, to get out the same volume of logs. Taking all factors into account the effect would be equivalent to reducing the net income of each of 310 workers by $476 annually.

It was found that when all these impacts were added together they amounted to a total annual cost of $518,000. When capitalized, this cost was equivalent to an initial expenditure of $21,000,000—not enough to upset the benefit-cost ratio of the dam but nevertheless an intolerable burden on the locality. There were only 8,700 people in that area in 1950.

Different dams are going to pinch in different ways and to different degrees.

[1] This study was made jointly by the Administrative Branch of the U. S. Forest Service and the Northern Rocky Mountain Forest and Range Experiment Station at the request of the Corps of Army Engineers as part of the planning for the proposed Libby Dam on the Kootenai River in Montana. So far as is known, it represents the most intensive analysis yet made of the impacts of a big dam on a local economy.

Therefore the only generalization we can make is that measurable community impacts will result from most dams. With some overlapping the impacts can be catalogued under the following general headings: (1) financing or operation of local governments, (2) magnitude or balance of community income, (3) utilization and marketing of resources, (4) protection and administration of resources, and (5) general travel and maintenance of travel facilities.

A Public Policy

Public policy should, of course, recognize the precedence of regional interests over local interests, and the consequent fact that the communities in which big dams are built may have to pay a disproportionate share of the cost of regional benefits. On the other hand, it would appear equally desirable public policy to give impact costs the same weight and consideration as installation costs in evaluating big dams. This means more than merely acknowledging the existence of these costs. The magnitude of the impacts should be measured as precisely as possible and expressed in dollars insofar as possible. If impacts are thus evaluated and carefully considered when plans are being drawn, local communities will have a greater assurance of fair treatment.

Impact costs of the sort mentioned above in connection with the proposed dam on the Kootenai River can be reduced. In that particular instance national forest administration costs could be held near their present level by building a bridge across the reservoir. Timber transportation, public travel, and employee income impacts could likewise be reduced drastically by building the bridge and a high standard road system instead of doing a minimum job of replacing roads. As a matter of fact, with a sufficient restoration of the facilities inundated or dislocated, the impact costs of a dam at that location would only be $52,000 a year instead of $518,000.

Obviously, when the factor of accessibility is involved, impact costs will generally vary inversely to the installation costs. Lower impact costs can be achieved by spending more for roads and other facilities. Installation costs can be held down by doing a minimum job of replacing these facilities. For sound planning it then becomes necessary to consider the alternatives for restoring services and to select the plan which results in the proper balance between the two kinds of costs. In some instances the plan involving the lowest installation plus measurable impact cost may be best. In others it may not, because certain intangible costs justify a more extensive replacement of facilities or because too large a part of the cost of the cheapest plan is impact cost. The general objective should be to find the cheapest plan which fairly distributes the total cost of the project. More often than not, the principal benefits will be enjoyed by downstream communities. It would seem then, other things being equal, that the same large share of the cost of these dams should likewise be borne by the regional economy instead of the local economies.

An approach which relates the restoration of roads and other facilities to impact costs is a far cry from the "replacement in kind" theory which still has some advocates. This theory calls for replacing the inundated 12-foot road in the valley bottom with a 12-foot road above the reservoir line. The fact that it may cost 10 million dollars to make the mountainside road into the main highway ultimately needed for the development of the local resources whereas 2 million dollars

would do the same job in the valley bottom is disregarded. This type of thinking is no longer acceptable, if it ever was. Water resource development is not an end in itself. It is merely one phase of an effort to expand the living opportunities of a region. It is particularly appropriate then that each dam built for water development be fitted carefully into the local economy so that its benefits are not nullified or reduced by needless impact costs.

A Regional Planner Speaks on Milestones

"The record of the past thirty years in urban development, planning and housing is hard to characterize briefly. Urban and metropolitan growth, particularly in suburban areas, have gone on apace. Public concern and public policies, both of direct action and of guidance to private undertakings, have increased greatly. With notable exceptions, including the ill-starred research program in Housing and Home Finance Agency, contributions to understanding of the basic factors in this sector of our economy have lagged well behind.

"I do suggest, however, that without *Land Economics* the lag would have been much more serious than it has been. Although relatively few urban land economists have been recognized by universities or other research agencies, this Journal has provided a respectable and often a lively forum for the studies of professional planners, housing specialists, urban sociologists, lawyers, procurement officials, political scientists and some economists on many phases of this complex and changing field. We have grounds for hoping that, during the next thirty years, research in the substantive problems and involving policies in this area, as well as *Land Economics* itself, may continue to gain in significance and influence."
—COLEMAN WOODBURY, *Norton Professor of Regional Planning at Harvard University, and member of Editorial Board of Land Economics, one-time student of its founder.*

And Deliver Us From Big Dams

By WALTER M. KOLLMORGEN*

FOR various reasons, floods have had a poor press during recent decades. It is time that the American public discovers that it is not only the better part of valor to live with floods in a sensible way, but that it will also prove a great deal cheaper, and even profitable, to do so.

That floods and flood-plains go together seems to have been erased almost completely from the public mind. When a flood rolls down a flood-plain and fertilizes the lowlands, all headlines scream with anguish as they report this violation of presumed spatial sanctity. Woe to the popular leader who dares to suggest that at such times the river is merely reclaiming its own, its own creation.

As of old, all evils, actual and alleged, call forth the services of the priesthood—whose services always come high. In the case of floods we now have the services of the Corps of Engineers who cast a dubious eye on every drop of rain and presume to restrain its every movement to the sea. This service needs to be supported by lavish public funds and so the flood-control campaign is a continuing one, entailing both psychological warfare and tremendous engineering works. It is in substance a total war with a price-tag suggesting total mobilization. This is well demonstrated by the extravagant plans we are contemplating in the Kansas River Basin.

In 1951 eastern Kansas experienced a flood of such proportions that the probability of its recurrence is estimated in terms of one to several centuries. This experience has taught us not only what a major flood is like, but also what it takes in big dams to cope even partially with such vast seas of water. Unprecedented floods call for an unprecedented number of dams with associated land destruction, according to the Corps of Engineers, and many a Kansan is convinced that this form of cure is more disastrous than the floods themselves.

Flood mitigation plans are tailored to meet local and basin-wide flood experiences. Since most floods are minor, a so-called flood-control plan for one area may appear modest and appropriate. During the course of years, however, bigger and bigger floods will come—as they have in Kansas—and their larger losses will bring larger engineering proposals. The proposals for the Kansas River Basin give us a preview of what lies in store for us and our children if present procedures to cope with flood waters become standard.

The well-known Pick-Sloan Plan, which had received the blessings of Congress several years prior to the flood of 1951, projected a total of 18 major reservoirs in the Kansas River Basin as well as major levees in urban areas. Only several of these dams had been built at the time of the flood. The proposed levee works at Topeka and Kansas City were in place but these were breached by the high waters descending the wide floodplain of the Kansas River.

Losses and destruction occasioned by the flood immediately focused attention on the uncompleted features of the flood-control plan for the entire valley. The general impression was that, if the public and Congress had properly supported the dam-building program and if several of the larger dams had been in place near the Kansas River, the disaster would have been averted. Erstwhile opponents

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of the dams seemed to be thoroughly chastened by the seemingly righteous indignation of many editorial writers and by the hapless Army Engineers, who felt themselves fully vindicated in their long-time proposals and manipulations. The latter took the position that the dikes at Kansas City failed because the dam-building program lagged, although it is interesting to note that, when the dikes were breached without preparation and anticipation, the Army Engineers were fully preoccupied with the flood situation away from the metropolitan center. Apparently they did have complete faith in this handiwork. This faith was also reflected in the business-as-usual behind the dikes when the flood water breached the ramparts, deeply inundating everything from loaded stockyards to loaded freight cars that could readily have been moved and saved.

Few people realized during those critical days that they were witnessing a flood of such proportions that no established plans, even if they had been fully executed, would have modified its destructiveness in any material way. The flood protection works along the Kansas River in the Kansas City area were built to accommodate a flow of about 260,000 second feet, a measure based on the previous major flood in 1903. During the height of the flood the Kansas River delivered 512,000 second feet of water into the Missouri River.

Proponents of the Pick-Sloan Plan were soon confirmed in their zeal by what appeared to be an authoritative pronouncement on the benefits several of the proposed dams would have yielded under the experienced flood conditions. On July 25, 1951, the Chief of Engineers in Kansas City said that "if we had had Milford and Tuttle Creek reservoirs we could have passed this flood by Manhattan and Topeka. If we had had Milford, Tuttle Creek, and Perry, we could have passed it by Lawrence, and with these three, plus the existing levee system at Greater Kansas City, the disaster here could have been averted." To my knowledge no retraction has ever been made of this falsehood.

Many of us who saw the tremendous volume of flood waters surging down floodplains questioned the above statement by the Army Engineers and also questioned whether the building of multiple dams was the proper approach to the flood problem in the flat and rolling lands of our Midwest. My computations did not confirm the above statement of the Army Engineers. In fact, I reached the conclusion that if all 18 of the dams proposed for the Kansas Basin had been in place, little difference in flood losses would have resulted. An article I published at the time, entitled "Floodplains Sometimes Flood," contains the statement:

> "We can have more or less complete flood protection in this valley—for a time—if we develop a series of stair-step lakes up and down the valley and flood the whole floodplain after we have removed all the people and their improvements from the lowlands . . . . We can have partial protection if only a limited number of dams are built. Note, however, that the several dams now sponsored by the Army Engineers and advocates of the Pick-Sloan Plan as urgent would not have given us protection this summer. No set of dams now in the blueprint stage would have done that. Consequently these urgent dams are only a beginning of a complex maze of water-control works now advocated by the dam builders."

This statement (published in *Upstream*, October-November 1951, pp. 19-28) was one of the early published reports questioning the words and works of the Army Engineers.

In spite of the misleading claims of the Army Engineers quoted above, even they seemed to feel the need for a greatly ex-

panded flood-control program. The pre-flood plan of 18 basic reservoirs was expanded to 34 basic reservoirs, and the water capacity of many of the 18 dams in the pre-flood plan was greatly increased —about 100 percent—by converting wet dams to dry dams. Moreover, 84 additional dam sites were listed for study preliminary to recommending many more dams, most of them on lesser streams. Note the increase in dams from 18 to a possible 118!

Early post-flood enthusiasm for the Pick-Sloan Plan cooled rather rapidly as the elastic nature of the plan unfolded and as building costs were translated into dollars and land destroyed by reservoirs. Particularly effective opposition developed in the Blue River watershed area on the Tuttle Creek Dam issue, which was well publicized in the papers. Several significant developments took place in short order: (1) Congress appropriated five million dollars to begin construction of Tuttle Creek Dam. (2) The congressional election in the first district of Kansas, which included the Tuttle Creek, Manhattan, and Topeka area, was, for the first tine in history, won by a Democrat—on a platform opposing Tuttle Creek Dam. (3) Governor Arn of Kansas appointed three of the foremost engineers of this country to make an independent study of the flood problem in the Kansas River Basin and also to evaluate the "plans for the reduction of flood discharges in the Kansas River Basin as promulgated by the U. S. Army Corps of Engineers, the U. S. Bureau of Reclamation, and the U. S. Department of Agriculture." (4) President Truman's Committee on Flood Control issued its report of the Missouri River Basin and this report expressed grave doubts about the expanding Army Engineers' dam building program in the Kansas River Basin.

The engineers appointed by Gov. Arn issued their report in June 1953. Since their sponsoring agency was the Kansas Industrial Development Commission, their findings are usually referred to as the KIDC report. The engineers were N. T. Veatch of Kansas City, Louis R. Howson of Chicago, and Abel Wolman of Johns Hopkins University in Baltimore. All three of these men stand among the foremost consulting engineers in this country. In my opinion their report on the Kansas River Basin represents a most significant milestone in all so-called flood-control literature.

The KIDC report should completely shatter the illusion that multiple dams in our Midlands will buy an economical and practical program of flood protection. Concerning the 18 dams proposed before the 1951 flood for the Kansas River Basin, the report states (pp. 54-55):

> "Data furnished by the Corps of Engineers indicate that if the authorized Pick-Sloan system of flood control reservoirs, as well as the recommended Milford and Perry reservoirs (18 reservoirs in all), had been in operation, with all allocated flood storage volume empty at the beginning of the 1951 flood period, the peak flow through the Kansas City area would have been approximately 360,000 cubic feet per second. The Board's present finding is that the existing flow-way for the Kansas River through the Kansas City area in July 1951, was carrying a maximum flow of 262,000 cubic feet per second when the Argentine levee was overtopped. At the time the Armourdale levee was overtopped, the channel was carrying a maximum 308,000 cubic feet per second. In other words, had all of the above-mentioned 18 reservoirs been in existence in 1951, a disastrous flood would still have occurred in the Kansas River from Manhattan to the mouth."

Equally significant are the findings concerning the expanded 34-basic-reservoir program developed after the flood by the Army Engineers (KIDC report, p. 57):

> "Data supplied by the Corps of Engineers show that its presently proposed 34-reservoir program, if it had been in operation during the 1951 flood period, would have reduced the maximum discharge at Topeka to 210,000 cubic feet per second, and that at Bonner Springs to 225,000 cubic feet per second. Such a flow in the River—nearly 90 percent as great as that of the 1930 flood —would have exceeded bankfull stage by 10 feet at Topeka and by more than 7 feet at Bonner Springs, and would have caused wide inundation of the valley lands not protected by levees."

Note that the post-flood plan of 34 basic reservoirs would not have saved the agricultural lands in the floodplain of the Kansas River because average depth of inundation would still have been from about 7 to 10 feet. At least in the Kansas River Basin, flood control no longer means control of floods.

Advocates of the Pick-Sloan Plan in the Kansas City area will also do well to remember that, even if most of the waters in the Kansas River Basin are contained by a series of big and little dams, that city can still experience disastrous floods generated along the lower undammed part of the Kansas River as well as by flood waters generated along the Missouri River below Sioux City. This point is well stated in the Missouri Basin Survey Commission report (*Missouri: Land and Water*, Washington, 1953, p. 130):

> "The basic difficulty that stands in the way of effective reservoir control for the Kansas Citys is the absence of suitable dam and reservoir sites close above the cities. On the Missouri River, after completion of the main stem reservoirs in the Dakotas, there will remain an uncontrolled tributary watershed area of some 100,000 square miles. On the Kansas River there is an additional 31,000 square miles whose outflow is not now controlled; and this would be reduced to 9,500 square miles by the construction of the reservoirs now authorized (Tuttle Creek, Perry, Milford, Glen Elder, Wilson, and others still further upstream). If all the additional reservoirs on small tributaries, as proposed by the Corps of Engineers after the 1951 flood, were also constructed, the uncontrolled watershed area on the Kansas River above the Kansas Citys would be reduced to a minimum of 6,800 square miles.
>
> "Although the latter figure may seem relatively small, it should be remembered that a nearby watershed less than half as large (the 2,933 square miles above the gage on the Neosho River near Strawn, Kansas) produced a peak flood flow of 400,000 cubic feet per second in July, 1951. Obviously the remaining minimum uncontrolled area of 6,800 square miles would still be capable of producing at the Kansas Citys a larger flood than that which occurred in 1951, when the peak flow was 510,000 cubic feet per second. The vast uncontrolled area on the Missouri River above the Kansas Citys can reasonably be expected to produce still larger floods."

At least some of the lessons of the 1951 flood should be obvious at this point. An extraordinary number of dams seems to be necessary in our flat and rolling lands to make a significant impression on a hundred-year or several-hundred-year flood. Moreover, many scores of cities and towns on lesser streams and those above proposed dams will have gained no flood protection for which they helped to pay and which they may demand as a matter of right. It follows that even if 118 dams are built, protection would still be partial and the clutter of dams would have to be expanded.

Building a multiple of dams also raises serious problems with reference to time of achievement. The relatively small number of dams recommended prior to the 1951 flood was referred to as a quarter-century project. Even if the building program is accelerated, it is difficult to believe that the many scores of structures now recommended and under study can be achieved in less than half a century. Food disaster after flood disaster can occur during such a long period.

To embark on a super dam-building program raises other significant problems. If such a program is adopted, the trend to locate additional major improvements in the hazardous floodplain areas will be accelerated. Growing confidence in so-called flood protection measures will outstrip the dam-building program and so the prospect for greater and greater disaster looms. This type of danger is well reflected in unlike flood losses associated with the 1903 and 1951 floods. The estimated loss of the former was about $22,000,000 in the Kansas River Basin whereas damages from the 1951 flood have been estimated at about $725,000,000. As the dam-building progresses, it will generate increased momentum in other developments. The more dams, the more developments gravitating to the lowlands; and the more developments appearing in these lowlands, the greater the pressure to build more dams. Essentially, therefore, there is no half-way point when protection has been achieved half way; it is all or nothing. And all or total protection means almost total flooding of the floodplains in the watershed.

Dams are not built merely for the sake of building dams—although it may appear that way to many of us—but are justified in terms of the economic benefits they are supposed to yield. Presumably the benefits that will follow from such a construction program will be greater than the cost of the dams. This presumption, however, is no longer correct in the Kansas River Basin because the number of dam structures required to cope with a hundred-year or several-hundred-year flood gives rise to a cost factor that is completely out of harmony with the benefits that can be demonstrated. In fact, since the devastating 1951 flood, nearly all calculations have been directed toward finding more and more storage capacity behind proposed and probable dams rather than to cost factors or to alternative approaches to the flood problems.

All values with regard to flood mitigation programs have been revised so drastically that the advocates of the traditional approach now find themselves in a most untenable position. This is particularly true of the Corps of Engineers. By training and disposition they find themselves completely unprepared to deal realistically with the present challenge. Their traditional approach of building more and more dams until all flood waters are contained simply does not make engineering sense, nor geographic sense, nor economic sense. Their program for the Kansas River Basin is about as realistic and up-to-date as the use of bloodsuckers for high blood pressure. Over a period of years they have developed peculiar fixations with regard to dams, floods, and even every rain drop. As the late Harold Ickes aptly pointed out several years ago, "every little drop of water that falls is a potential flood to the ubiquitous Army Engineers and they therefore assume it to be their duty to control its destiny from the cradle to the grave."

The cost of the flood mitigation program for the Kansas River Basin and in part also of the Pick-Sloan Plan has grown so rapidly during recent years that Jack's beanstalk looks like a stunted sapling by comparison. The KIDC report makes frequent references to the explosive costs of the rapidly expanding program. On p. 51 it says:

> "As far as the Board can determine, the efforts to protect urban and rural areas of the Kansas River against the destructiveness of floods have grown in estimated cost over 20 years from less than $25,000,000 to well over $1,000,000,000. Any firm estimate of the exact costs of joint Federal proposed programs is still impossible, until these programs have been more completely crystallized than is now the case."

Note that the increase in estimated costs of proposed programs is well over 4,000 percent. Project similar increases in cost to the rest of the country and you are contemplating a program whose price tag looks like the national debt.

While the cost of the flood mitigation program in the Kansas River Basin has spiralled upward during recent decades, the greatest upward revisions came after the 1951 flood. The 18 dams recommended in 1950 would cost about $400,000,000 according to latest estimates, The additional basic reservoirs now recommended and the enlargement of the storage capacity of previously recommended dams involves an additional estimated cost of $300,000,000. After this, there still remain the 84 reservoirs which are in the study stage. To maximize flood mitigation under a dam-building program, many of these will also have to be built, and so the total cost will approach and perhaps even exceed one billion dollars. After we have spent this kind of money for so-called flood protection we still have not paid one dime for soil conservation or for the watershed program, nor provided money for the Bureau of Reclamation to bring irrigation waters to farmers at a cost of $400 to $3,000 per acre.

The above cost figures may seem shocking but they are really on the conservative side, and only partial flood protection will be achieved by such an expenditure. Rarely do the Army Engineers or the Bureau of Reclamation build a dam at estimated cost. A conservative estimate on estimated costs is that actual costs should be placed at least 50 percent higher than estimated costs. This simple yardstick would yield a total cost of 1½ billion dollars. But even then the program is not finished. Much unprotected land will still remain along many streams, particularly lesser streams, and scores of cities and towns would remain completely unprotected. Since the politicians will be tempted to bring the blessings of such bountiful spending to the remaining floodplains and cities in the Basin, it will be very simple to spend up to two billion on so-called flood-control measures in the Kansas River Basin. The expenditure of such a sum will not only put the taxpayer through the wringer, but it will also destroy nearly all the best land we have in the Basin. It is the most effective program of self-destruction ever devised in the name of planning.

Another somewhat general method of computing the cost of an over-all flood-mitigation program for the Kansas River-Basin indicates an expenditure of over two billion dollars. South of Lawrence and Topeka flows the Wakarusa River, a tributary to the Kansas River, with a watershed of 512 square miles. The authors of the KIDC report projected a program of maximum flood protection achieved with dams for this basin and translated such a program into cost figures. Mr. Veatch stated that the cost of such a program for this minor basin would be about 20 million dollars, or about $40,000 per square mile of watershed. If this cost factor is applied to the entire Kansas River Basin the so-called flood-control program would cost nearly two and one-half billion dollars. It is interesting and important to note that this method of determining the cost of the end product of a dam building program yields a somewhat higher total cost than the method used above, but that in each case total costs approach or somewhat exceed two billion dollars.

As high and impressive as the above cost figures are, they still obscure the real cost of achieving some measure of flood mitigation for the area really benefited. Certainly the floodplains in the Kansas Basin must be presumed to be the main

beneficiary of any flood-mitigation program in that Basin. About 900,000 acres of this floodplain flooded in 1951. Of this area, at least half will be extinguished in a dam-building program; much of the remaining 450,000 acres of lowland will lie above impounding lakes and therefore will not be benefited. Let us assume, however, that about 400,000 acres will be benefited at an over-all cost of about two billion dollars. This approach yields us a cost of about $5,000 per acre benefited. If, for good measure, we add another 1,000,000 acres that might be benefited more or less below Kansas City, the per acre cost is still about $1500, a cost about four times as great as the actual value of the land.

The foregoing cost data cover only the traditional so-called flood control program of big dams for the Kansas Basin. They still do not reveal the full cost of what the planners are projecting by way of controlling flood waters. So far we have considered what is largely the handiwork of the Corps of Engineers, although many of the dams in the western part of the Basin are planned and built by the Bureau of Reclamation, serving both irrigation and flood control. These dams are included in the lists presented above and so are the costs allocated to flood mitigation. It remains, therefore to make some brief reference to the watershed program of the U. S. Department of Agriculture.

The watershed program of the U. S. Department of Agriculture may bring more widespread benefits to farmers than the more localized flood-mitigation programs, but it is doubtful that it will be much less expensive in terms of federal expenditures. At least in the Missouri Basin as a whole the Corps of Engineers, the Bureau of Reclamation, and the U. S. Department of Agriculture have watched each other's cost estimates rather closely, and it doesn't seem altogether fortuitous that the prices of their respective prescriptions have moved forward and upward at a remarkably even rate.

No official cost estimates are at hand on a watershed program covering the entire Kansas River Basin. Such estimates have, however, been prepared for the Big Blue Basin, which comprises about 9,600 square miles within the Kansas Basin. The total cost of this program is estimated at about 94 million dollars, of which about 57 million represents federal costs. However, the Department of Agriculture has had about the same trouble in estimating costs of watershed work as the Corps of Engineers and Bureau of Reclamation have had in estimating costs of dams and irrigation works. To approach real costs, experience in other watershed suggests that the 57 million dollar item should be doubled. This yields a square-mile cost of about $12,000 for the Big Blue Basin, and, by extension, a total federal cost of about 700 million dollars for the entire Kansas River Basin. If we combine this projected watershed program cost for the entire Basin with the estimated flood-mitigation cost of about two billion, we arrive at a federal largess of somewhat less than three billion, or $2,700,000,000. Translated into another form, this yields a federal expenditure of about $70 per acre, a cost which nearly approximates the average value of the land in the Basin. Perhaps we should call these combined programs the Kansas Basin Purchase of the 20th century, partly to remind ourselves of the bargain Jefferson gained in the Louisiana Purchase. What the federal planners offer us in the Basin is definitely not a bargain.

In addition to the financial costs, the big dam program entails a tremendous cost in land destroyed by reservoirs. It

matters little whether dams are designated as dry dams or wet dams because most floods in the Kansas River Basin come from May to July, and so impounded waters would frequently preclude the use of the floodplains behind the dams. The KIDC report supports this prospect as follows (p. 60): "In the 11-year period from 1941 to 1951, inclusive, in only two years is it likely that a crop could have been made on the floor of a reservoir site anywhere in the Basin east of Salina."

It is of course axiomatic that the more dams we build the more land we destroy. At this time we are facing the prospect of losing a minimum of 450,000 acres of the best land in the Kansas River Basin if the Army Engineers are encouraged to go ahead with their destructive program. Even in terms of this minimum loss, we would be destroying one acre above the dams to effect some flood mitigation for one acre below the dams in the Basin. This, however, is not a full prospective of the land destroyed by reservoirs.

Although most floods are minor, a dam-building program must be projected in terms of maximum possible floods, or let us say, hundred-year or several-hundred-year floods. For varying periods of years we would therefore actually be destroying the productivity of several and even many acres to realize some flood protection for one acre of land.

It must also be remembered that even the post-1951 flood-control program of the Army Engineers is still fluid, and that it does not provide full protection to the Kansas City floodplain area along the Kansas River, nor does it provide protection to cities and floodplains lying above presently proposed dams and lakes. To maximize protection for the Kansas City floodplain it is imperative that another major dam be constructed not many miles above the city on the Kansas River, probably in the Bonner Springs area. This dam would certainly flood 100,000 acres of the choicest farming land in Kansas. In like manner, other dams need to be added to protect other cities and areas lying largely on lesser streams and above established dams, and so it is proper to anticipate the destruction of about two-thirds of the flood plains in the big-dam program of flood mitigation.

According to the KIDC report, about 1,500 farms will be destroyed by flooding 450,000 acres in the Kansas Basin. This is a greater number of farms than are found in an average county in the state of Kansas. Floodplain lands sell at prices ranging from two to four times as high as bordering uplands. This higher value results from higher productivity even though floods bring occasional losses of crops. In terms of average farm income, therefore, we are not destroying 1,500 farms but what amounts to 4,000 to 6,000 farms. This, in turn, is equal to the loss of four to six counties in the state. The loss is even greater when the ratio is is based on lands lying in the eastern part of the Kansas River Basin.

Even the above listed losses of superior agricultural lands do not reflect fully the shattering effect of the dam-building program. Many farms in the eastern part of the Kansas Basin are composed of very productive lowlands plus uplands with thin, erosive soils which are or should be in grass. Holdings of this kind lend themselves well to a livestock-grazing economy. Cattle are pastured in the uplands and intensive feed crops are produced in the lowlands. Hundreds of such balanced farm holdings will be shattered by reservoirs, which will comprise thousands of acres of these floodplain lands. The Tuttle Creek project is an excellent example of how a cattle-grass-feed economy can be destroyed by the big-dam program.

There are other agricultural problems that will follow a big-dam building program to which the Army Engineers have given no attention whatsoever. Consider, for example, the pressure on land resources by the present number of farmers in Kansas. As a general proposition it can be said that farms have always been undersized in Kansas in terms of good, permanent land-use programs. The inadequacy of the Homestead Act in western Kansas soon became apparent by the failure of thousands of farmers who tried to grow crops on a quarter section of land. Many thousands of farmsteads have been abandoned in this short-grass country, and much of this abandonment took place as recently as the 40's. In part, this abandonment reflects pressure on the land and the need for larger farm units.

In eastern Kansas the size limitations of the Homestead Act have encouraged the overplowing of uplands which have a thin mantle of highly erosive soil. One result is that eastern Kansas is now one of the more seriously eroded areas of the United States, and many thousands of acres have been ruined for profitable agricultural use. Another result is that eastern Kansas also has thousands of abandoned farmsteads which are partly an expression of the need for larger farm units and more grass lands. Many thousands of our farms are still too small for profitable operation and to introduce good conservation farming. These facts should be kept in mind when we contemplate the destruction of one-half to three-quarter million acres of our best floodplain farming land in a flood-mitigation program. If the proposed and prospective dams are built, we will drive many hundreds of our best lowland farmers into the already overplowed uplands where they will accelerate even more the ruination of our most basic resource, our farm land. This prospect is obvious to every agriculturally minded man, but not a single reference is made to this problem in the literature prepared by the Corps of Engineers.

The hundred-year or several-hundred-year flood we had in Kansas in 1951 was a great disaster to the people living in the lowlands. However, this disaster can teach us an important lesson of how we may and how we cannot afford to cope with vast flood waters. Properly interpreted, the flood of 1951 washed all the pre-flood plans of flood mitigation down the drain. To revive these pre-flood plans and expand them to their bitter conclusions would be even a greater disaster for Kansas and the Nation. These pre-flood plans and their post-flood elaborations are unsound from an engineering standpoint, disastrous from an economic standpoint, and ruinous from an agricultural standpoint. New approaches to flood problems are imperative.

In a paper I published in the fall of 1951, I pointed out that about 90 percent of the flood losses along the main stem of the Kansas River occurred in urban areas, mainly Kansas City and Topeka, and that these urban areas could have been protected completely by set-back dikes, allowing the stream from two to three widths of flow capacity. Subsequently the KIDC report fully confirmed this recommendation of flow-ways and translated it into construction plans and costs. It pointed out that these flow-ways can be achieved in a few years at a fraction of the cost of the multiple dams. These flow-ways can accommodate more flood waters than all the dams proposed by the Corps of Engineers. Moreover, only a little land is lost for industrial use, and it is lost near the area where all the benefits accrue. Dams, on the other hand, destroy entire agricultural valleys many miles away from the sites which are

the main beneficiaries of a flood-mitigation program.

A second recommendation I made that was also confirmed by the KIDC report was that the floodplains in the Kansas River Basin be zoned against many types of permanent improvements, particularly farm improvements, such as farmsteads. This floodplain is only about two miles wide and is bordered by high flood-free uplands. Present farmsteads in these lowlands can be moved to higher ground and similar new improvements would be zoned out of the flood hazard areas. Execution of this plan would also cost but a fraction of the big-dam program and at the same time preserve our agricultural wealth rather than extinguish it by flooding it more or less permanently.

A multitude of lesser dams may well be built in marginal land area sites, such as V-shaped valleys. Some of these would be wet dams and serve recreational purposes, but most of them would be dry dams, designed primarily to hold waters that might give rise to floods.

State and local participation in all flood mitigation planning and financing is essential. The temptation for pressure groups and congressmen to raid the federal treasury must be discouraged. No better curb can be devised than to require beneficiaries to pay at least a substantial part of projects they request.

The foregoing is not a flood-control program, but what we are now being offered also falls far short of a flood-control program. Remember that the 34 basic reservoirs now recommended by the Corps of Engineers would not have saved the farm lands along the Kansas River. It is less injurious to our farmers to take occasional flood losses than to lose from one-half to three-fourths of the floodplain permanently in the execution of a mislabeled flood-control program.

The above flood-loss mitigation program of flow-ways, zoning, and small dams is equally suitable for most of the flattish country of the Middle West. In very wide floodplains, a program of diking in cluster settlements is more expedient and economical than to expand an intricate program of river-control work.

While it is not difficult to suggest a reasonable program of flood mitigation for the Kansas River Basin and other similar basins, it is apparently impossible to translate such a program into reality so long as we need to look to the Corps of Engineers and other federal agencies for action. What the Kansas flood of 1951 and the federal planning that preceded and followed it have demonstrated is that federal planners are too steeped in traditional ways and are too inflexible to deal realistically with the modern complexities of flood-mitigation planning. To remedy this situation, at least in part, several basic administrative changes are imperative: (1) Basic planning for major projects, such as flood mitigation and reclamation, should be completely divorced from the construction and operating agencies. (2) Planning for major projects is so complex that it should be a team effort undertaken by a great variety of specialists, not merely engineers and economists. (3) Planners should be recruited for specific assignments from the academic and learned professions rather than be employed by the government on a permanent basis.

The above proposals may seem rather drastic, but they appear to be well warranted by experience not only in the Kansas River Basin but also in other parts of the country. No attempt can be made here to list and document all the evils and problems that have resulted from the present arrangement although they are the basis for the foregoing recommendations. Some supporting ob-

servations, however, will be made in behalf of several of the propositions, and these will be made with particular reference to the work of the Corps of Engineers.

Federal agencies that plan and justify their own engineering works are tempted to engage in empire building. Like individuals and business concerns, these agencies share the common American aspiration for growth and expansion. Lack of growth or a decline in activity is viewed as a disgrace. Moreover, since at least two federal agencies build dams, there is competition for sites and money. Possibilities for growth are enhanced by the vast size of this country, its substantial wealth, a low level of technical knowledge by the public, by misuse of terms and promises, by curious manipulations of cost-benefit ratios, and by support of organized minorities as against the lack of a common front by the unorganized majorities. Since more and bigger projects are a matter of self-interest and lead to growth, all manner of projects are recommended which are not in the public interest. These tendencies are obvious in the abstract as well as in practice, and therefore the recommendation that planning of projects be completely removed from the building or operation of major engineering, works.

The need for more diversified talents to explore proposals for flood mitigation is well demonstrated in the Kansas River Basin. It would appear that such a complex program as flood mitigation would require the services of such technicians as meteorologists, climatologists, hydrologists, geologists, engineers, economists, agricultural economists, pedologists (soil scientists), sociologists, political scientists, historians, geographers, and perhaps even others. Not only should all these specialists participate in flood-mitigation planning, but they should also be permitted, in the best of academic tradition, to present their views individually and collectively to the public. Under present arrangements, some of these technicians do work for the Corps of Engineers, but their separate contributions are lost in the front offices of the military dynasty, which on the whole generates more propaganda than sound engineering works.

A listing of all the contributions that can be made by the various technicians listed above is neither appropriate nor necessary in this short report. Nevertheless, certain contributions that seem to be urgent will be submitted, largely by way of example.

One of the first tasks that a committee of technicians should set for itself is to disabuse the public mind of all the incorrect notions about floods which have been cultivated by literature prepared by the Corps of Engineers and some other government agencies. Instead of treating floods as a normal, recurring expression of nature which has given the world much of the best agricultural lands, the promotional literature of these agencies associates only fear, terror, death, and destruction with floods. Much of this literature is on the level of comic books and certain varieties of poop sheets peddling nostrums of various sorts. Not only are floods cast in the form of a villain, but the hero and savior of the situation also reveals himself on every page, a hero whose preoccupation confounds our enemies abroad and tames rampaging floods at home. Flood control, of course is pictured as a rather simple procedure and one that pays big dividends. That many flood-control efforts have been wasteful and ineffective or have led to all manner of unexpected problems and expenses is never brought to the attention of the public. It does not take much research to discover all

sorts of skeletons in the edifices of our flood-control architects. Historians could perform a very useful service by reminding us of things promised in the field of flood control and related river developments and by equating these promises with the results achieved. This story is not one to encourage present trust in things promised.

Not only is it necessary to dispel the old wives' tales about floods, tales now cultivated in much of our government literature, but many other propagandist and promotional terms must also be set aside or corrected. In general, these terms greatly exaggerate what is considered bad or destructive and what is considered good and constructive. Consider, for example, the term "flood control." Rarely in the Midwest does this term mean what it implies and what it encourages the public to accept. We did not have a flood-control plan for the Kansas River Basin prior to the flood of 1951, and we have no such plan now. All we have is a growth—something like a galloping tumor—which would destroy the lowlands rather than protect them. Nor do we have a flood-control plan for the Missouri River Basin. So far we have only big dams and proposed big dams on big or major rivers. Hundreds of streams which flood as frequently as master streams are not covered by any so-called flood-control plan. Even master streams that are dammed or on which dams are proposed will have long stretches where floods can still be expected. Most of the so-called flood-control plans we hear so much about are merely a down payment on an installment program for which the end product is not in sight.

There are many other expressions and concepts in so-called flood-control publications that have no place in scientific literature. Common among these are "land destroyed by floods" and "stream stabilization." Landform specialists know that streams are dynamic features of the landscape and that meandering streams have a tendency to change their course. A stream that changes its course destroys some land but it also creates some land. Meandering streams are particularly apt to change their courses during floods. It is for this reason that during a post-flood period we are likely to hear much about land and farm land destroyed by the flooding streams. High values are associated with these lost lands so that the public is prepared to support more ambitious and expensive "flood control" works. But what about the land that was created or expanded by a change in a stream bed? Whereas some property holders may have lost some land, others certainly gained land. Why do we always hear about land losses and never about land gains? This question almost answers itself. It is the losses, actual or alleged, that provide the stepping stones for bigger though not necessarily better flood programs.

Whereas some streams in the world may be stabilized by the works of man, we are far, far from stabilizing major portions of the Missouri and Mississippi Rivers. Tens of millions of dollars are spent annually on so-called stabilization works, but this effort is largely a gesture. The dynamic processes of flowing water and ice render these restraining works temporary in effect and costly in execution. While we may decide to continue these gestures at terrific expense, the executors of this program should reveal the nature of this perpetual program and not suffer the public to believe that a finished product can be achieved by any plan now proposed or even contemplated. At least we could expect a group of technicians not interested primarily in dam and levee building to reveal the true nature of the present efforts which do not

and will not stabilize our master streams in the Midwest.

Equally revealing will be the contributions of soil specialists, as was well demonstrated in the lower Kansas River Basin following the 1951 flood. Immediately after this flood, the Corps of Engineers pyramided flood losses on flood losses, and estimated the total losses in the lower Kansas Basin at about $750,000,000. As usual, the flood was a complete villain and created only losses as it advanced. Releases quoting the Corps of Engineers led the average reader to believe that the flooded floodplain was reduced very nearly to a wasteland. Subsequently soil technicians at Manhattan State College made a careful study of soil changes in a section of the lowland and provided us with a more objective report. According to this study 72.6 percent of the acreage studied was slightly or materially improved by flooding; in about 13 percent of the area no change occurred, about 6.8 percent was slightly impaired, and only 7 percent was considerably impaired. Note that these soil specialists are not in the big dam building business. Apparently it makes a great difference in the flood losses you can discover if your program depends on impressive figures in that direction.

Agricultural economists, political scientists, sociologists, and geographers must also make their contributions to a comprehensive flood loss mitigation program. In fact, studies by these technicians should precede any planning by engineers. Often it is the unwise encroachment on floodplains that leads to flood losses. More discriminating use of floodplains may well preserve more of our present and potential wealth than flocdplains cluttered with big dams and impounded waters. As was pointed out above, about 90 percent of the estimated flood losses in the lower Kansas Basin occurred in urban areas and therefore reflect developments which in most cases could be shifted to upland locations. No permanent asset is lost by this shift. Flood-loss mitigation programs might well be directed, therefore, at zoning flood hazard areas against industrial developments. Programs like this, which preserve rather than destroy our natural wealth, are more likely to be generated by political scientists, agricultural economists, sociologists, and geographers than by engineers, particularly military engineers who are strongly steeped in traditional ways of doing things.

A team of technicians is also more likely to scrutinize properly the total setting and the over-all economy of a river basin before making recommendations which are largely or exclusively engineering in nature. In terms of area, agriculture is the main enterprise in the Kansas River Basin. Many farms are undersized and over-cultivated, particularly in the lower part of the basin where a big dam program would destroy much of the best land. In eastern Kansas we have large areas with a thin veneer of soil and soil material. Soils are highly erosive and serious, accelerated erosion is widespread. Thousands of farms are marginal in terms of size and income. Also, many farmsteads have been abandoned in this area or are in the process of abandonment at present. Moreover, much of this area has limited nonfarm employment opportunities because of limited industrial development. It is in this setting that a big dam program would destroy from one-half to three-fourths of one million acres of the best farm land we have. Many lowland farms would be extinguished completely. Many farms composed of lowlands and uplands would be shattered. It is difficult to visualize a more shattering and ruinous program in this area than a big dam pro-

gram, which would only mitigate and not control floods. An expanding dam building program would crowd more and more farmers onto the uplands with their thin and erosive soils. Even more land would be pressed into cultivation—which would accelerate its destruction. With this increased pressure on the remaining land resources, it is difficult to conceive of a conservation program, regardless of how elaborate and expensive it is, that could preserve the land. This dire prospect, which would become a reality with the big dam program, doesn't even rate a footnote in the literature of the big-dam builders.

Lastly, flood loss mitigation planning calls for the services of certain kinds of generalists in combination with narrow specialists. Competition for dollars, both private and public, promises to become more rugged in the days ahead. With all the pressing needs that confront us, we cannot afford to give a blank check to interests and planners concerned only with water manipulation. It is not difficult to project a 100-million-dollar road building program for this country. Nor is it difficult to project equally expensive programs for conservation reforestation, slum clearance, housing, education, health, and other activities. Our recent and present splurge in spending has given us a monumental debt and a fifty-cent dollar in combination with burdensome taxes. How many more debts do we want to create for our children? Apparently we can't satisfy the whims, notions, and self-interest of every pressure group.

Certainly we cannot afford to build enough dams to hold 100-year floods in all parts of this country—dams which will serve their full capacity only once in a century or so. Nor can we afford to displace the farmers that such a program calls for.

Institutional Arrangements in Water Resource Development†

By KRIS KRISTJANSON*

Introduction

FEDERAL participation in the development of land and water resources has been carried out by a multitude of departments, bureaus and agencies for a long period of time. Each agency is assigned authorities for specific functions. This has resulted in the growth of powerful agencies like the Corps of Engineers and the Bureau of Reclamation each with its own resource development assignment. Each one has built its own clientele whose interests are directly related to the agency's work. Each department and agency finds it expedient to keep peace with its own special interest groups. Conflicting interests, in the region where the resources exist, are unresolved locally; they come together for solution in the nation's capital, sometimes obscured or grossly distorted by lack of reliable information about the facts. Special interest groups converge on the capital to plead their case.

Under these circumstances it is difficult to get precision of fit between problem and proposal. Factual analyses and professional judgments made in the field do not always survive from the return trip to Washington. The result is frequently an uncoordinated program which does not give the people of the region the most effective use of the land and water resources.[1]

The recognition of this problem was reflected in 1908 in a statement made by President Theodore Roosevelt transmitting to Congress the report of the Inland Waterways Commission. In that message President Roosevelt criticized the "piecemeal execution of projects" which characterized the country's approach to the development of our rivers, the rehabilitation and conservation of our soils and forests, and urged that a new approach be considered. He said, "we shall not succeed" in making the best use of our rivers or for exercising foresight in their development . . . . until the responsibility for administering the policy and executing and extending the plan is definitely laid on one man or group of men who can be held accountable.[2]

This basic weakness in our approach to the development of our rivers continued to be recognized in national debates about resource development. In 1933 the TVA Act was passed after fifteen years of controversy over the disposition of Muscle Shoals and the development of the Tennessee River. This act introduced a new approach of *unified develop-*

† Published with approval of the Director, Nebraska Agricultural Experiment Station, as Paper No. 678, Journal series. The author's interest in the TVA grew out of a special assignment for the Tenure Committee of the Great Plains Council. Several state groups in the Missouri Basin were concerned about the dissatisfaction with Army Engineers' procedures in land acquisition. While employed by South Dakota State College and the Bureau of Agricultural Economics, he made a study of the effectiveness of TVA methods in land acquisition and management. This study aroused an interest in analyzing other phases of the TVA program. In writing this paper, he has used extensively a report entitled *Missouri: Land and Water*, prepared by the Missouri Basin Survey Commission, and a series of lectures on TVA presented by Gordon R. Clapp at the University of Chicago, February 22, 1954.

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[1] Throughout this paper it is assumed that an adequate procedure for the representation of conflicting interests will result in the most effective use of our resources. Economic analysis can help in the resolution of some of these conflicts but cannot provide an absolute standard for determining the most effective use of land and water resources in any particular case.

[2] *Preliminary Report of the Inland Waterways Commission*, U. S. 60th Congress, 1st Session, Senate Document 325 (1908) page 5.

ment of natural resources. In historical perspective it is clear that none of the responsibilities assigned to TVA were new to the federal government. For decades the federal government had been carrying on projects for the development and use of water for power, navigation, and control of floods; it had established laboratories for the improvement of minerals processing, for use of forest resources and for the improvement and testing of fertilizers. The TVA was not endowed with any new governmental powers.[3] However, the TVA Act provided for a unified approach to resource development through a *new administrative device.* The TVA Act created "a corporation clothed with the power of government but possessed of the flexibility and initiative of a private enterprise."[4]

This unified approach has met with success in the Tenessee Valley. Consequently, the merits of this approach are recognized by many people. This was evidenced by the Flood Control Act of 1944 where Congress *again* tried to formulate a comprehensive program for the development of the Missouri Basin.

The need was recognized but the administrative device necessary to accomplish this purpose was not provided. Instead we had a plan based on compromises between large federal agencies each having responsibility for specific functions. No administrative device was established for resolving conflicts of interest between groups within the region. Instead each federal agency continues to depend on legislative support from special interest groups.

When most federal projects were single purpose projects, a member of Congress could be certain that the expenditure of federal funds in his district would result in political support. Usually few people in the local community were adversely affected. This led to a very extensive practice of vote-trading for federal construction projects.

However, the large-scale multipurpose projects introduce new conflicts of interest that must be resolved. Alternative uses for a limited supply of land and water lead to conflicts of interest. The present large-scale programs often result in adverse effects for a substantial number of people. This leads to organized opposition as evidenced by the Tuttle Creek situation in Kansas and the Niobrara Project in Nebraska. There is a need for resolving these conflicts on the local and regional level. Ten years of experience with the multi-agency approach to river development in the Missouri Basin illustrates the kind of problems that arise when there is no administrative device for resolving these conflicts.

It is my purpose here to discuss some of these unresolved conflicts and explore possibilities for improved procedures. I will briefly describe the Missouri Basin and the present action programs before discussing some of the specific conflicts involved in the development of the resources of the area. Finally I will draw on the experience of the TVA to indicate how some of these basic difficulties can be resolved.

The Missouri Basin

The Missouri River Basin and the Great Plains is a vast region which extends from the Continental Divide down the eastern slope of the forested Rocky Mountains, through the semi-arid Great Plains, to humid east-central Missouri. It covers an area of about 340 million acres of which more than half is grassland, one-third is cropland and a little less than one-sixth is forest and woodland. About

[3] Gordon R. Clapp, "The TVA: An Approach to the Development of a Region," lecture presented at University of Chicago, February 15, 1954.

[4] Muscle Shoals Development, U. S. 73rd Congress, 1st session, H. Doc. 15 (1933) page 1.

4½ million acres are under irrigation. More than one-fifth of the land in the Basin is in federal and state ownership. There are more than one-half million farms and ranches in the Basin. These range in size from an average of 170 acres in the lower Basin to an average of more than 1,500 acres in the upper Basin.

The Basin is an important area in the nation's economy. It contains one-fourth of the nation's cropland, and the sale of live animals, wool, and meat exceeds one-fourth of the national total. The Basin also produces more than one-fourth of the nation's corn and more than one-third of the nation's wheat, sugar beets, barley and rye.

The area is characterized by extremes in weather and agricultural production. Droughts and floods occur frequently, sometimes in quick succession or even in the same season. But there are many years of high production, too. Over much of the area, however, farm income is highly variable and special problems arise. Much has been done to meet the problems peculiar to the Basin but many others require further study. While the basin is an area of extremes, it also has many resources, most of which are capable of further development.

The Basin's Action Programs

In 1944 Congress approved plans for an expanded program of flood control, irrigation, power, navigation, and other developments for the Missouri Basin. More than 150 reservoirs are planned, most of which are multiple-purpose. Power is to be developed at most of the larger dams. More than five million acres of new irrigation are planned and supplemental water is to be provided for two million acres now under irrigation. These programs would be carried out by the Army and by the Bureau of Reclamation.

In 1949 the Department of Agriculture recommended an agricultural program for the Basin. This program has not been authorized although Congress recently authorized accelerated agricultural work in a few small pilot watersheds throughout the nation. It is estimated that the programs authorized plus those proposed would cost a total of 16 billion dollars. Of the work authorized, a little more than 2 billion dollars is under construction.

The cost of projects under consideration by the Army is estimated at nearly 4 billion dollars, of which about half is under construction. The cost of projects under consideration by the Bureau of Reclamation is nearly 4½ billion dollars, but less than 15 percent is under construction. The accelerated agricultural program recommended for the Basin by the Department of Agriculture, but not authorized by the Congress, would involve a federal cost of 3 billion dollars and landowners and farmers would be expected to invest 3 billion dollars as their part of the cost of installations. But thus far Congress has appropriated only 5 million dollars for accelerated agricultural work on some 50 small pilot watersheds over the nation. Several of these pilot watershed improvement projects are in the Missouri Basin.

Of the federal cost of more than 11 billion dollars, latest plans are for about 29 percent to be spent for irrigation, 28 percent for accelerated agricultural program, 23 percent for flood control, 15 percent for power, 2 percent for navigation, 2 percent for Missouri River bank erosion control work, and 1 percent for municipal water supplies.

Problems

The Missouri Basin Program is a gigantic governmental operation requiring many important decisions. Since the authorization of the Pick-Sloan plan in

1944 the program has been characterized by problems which cannot be resolved under existing jurisdictions. Much of the confusion results from divided authority between federal agencies and lack of clear responsibility for major decisions. Several individuals and groups have pointed to the inadequacies of the present multi-agency approach to river development. Among others, the resource development task force of the Hoover Commission, Congressional committees, and the 11-member Missouri Basin Survey Commission pointed to basic inadequacies of this plan.

Financial Accounting. Confusion and ineffective planning have resulted from the inability or unwillingness of federal agencies to work together and to agree upon financial fundamentals. For example, the federal action agencies have failed to reach an agreement on the allocation of the cost of the major multiple-purpose dams on the main stem of the Missouri—Gavins Point, Fort Randall, Big Bend, Oahe, Garrison and Fort Peck.

The question at issue is what portion of the total cost should be allocated to flood control and navigation and how much should be allocated to power and irrigation. Flood control and navigation are nonreimbursable while power and irrigation are reimbursable. The Corps of Engineers favors larger assessments to power and irrigation and the Bureau of Reclamation favors a larger assessment to flood control and navigation. The amount in dispute is $500,000,000.

The question of allocations has a direct bearing on water charges, power rates and financial feasibility of many projects. The federal agencies have no effective way of resolving these disputes. Furthermore, the general public and Congress have no practical means of learning about these differences. A recent report by a sub-committee on Public Works concluded "that at the present time the agencies of the executive branch are operating in considerable confusion in the problem of allocation of costs."[5]

If the $500,000,000 in dispute is allocated to power, the currently proposed rates will carry about half the cost of power. On the other hand, if the larger amount is allocated to flood control and navigation, the costs paid by the taxpayer for those two purposes would be about twice the benefits claimed.[6]

Repayment of Irrigation Costs. The general public has been led to believe that costs of irrigation are repaid to the treasury from either irrigation or power revenues. The Missouri Basin Survey Commission Report indicates that irrigation revenues pay approximately 15 percent of the cost of constructing the irrigation works when interest is included as a cost. The remainder would be paid by the taxpayer if it finally is decided that all or a major part of the $500,000,000 in dispute should be allocated to irrigation and power—and there are indications at least that a substantial portion should be.

In trying to clarify the financial issues involved it is important to understand the use of the Missouri Basin Account. The Reclamation Act of 1902 provided for repayment of irrigation construction costs by water users without interest on deferred payments. Later legislation authorized the use of power revenues from government-constructed projects to help repay irrigation construction costs.

In the present Missouri Basin program, representatives of the Bureau of Reclama-

[5] House Committee Print No. 23, *The Allocation of Costs of Federal Water Resource Development Project*, Report to Committee on Public Works from the Subcommittee to Study Civil Works, 82nd Congress, 2nd Session, page 29.

[6] Ottar Nervik, Kris Kristjanson, Willard Schutz, and Sigurd Stangeland, *Economics of Federal Irrigation Projects in the Missouri Basin*, South Dakota State College Experiment Station Circular 110, 1954.

tion state that any irrigation costs which cannot be repaid by water users will be repaid to the treasury from power revenues. All interest on power allocations plus power revenues after power allocations are repaid are used to show financial feasibility for irrigation and power. This in effect makes the power investment interest free. This pooling of revenues is known as the Missouri Basin Account.

The Missouri Basin Survey Commission reveals, however, that with the Army's allocations the power revenues will probably no more than retire the cost of power within a 100-year period. In other words, there may be no surplus revenue from power to carry the cost of irrigation.

Use of Indirect Benefits for Project Justification. The proposed federal program for the development of irrigation in the Missouri Basin is presented as being *economically justified* as well as *financially feasible*. That is, it is claimed benefits exceed the costs and that the costs will be repaid. How realistic are the benefit cost ratios which are used to show economic justification?

Benefits are generally classified as direct benefits and indirect benefits. Direct benefits are the value of goods and services resulting from the project and are measured by market value. In irrigation projects the increase in net farm income for instance is a direct benefit. Indirect benefits are said to arise from such things as additional processing and transportation of farm products and the additional demand created in the project area.[7] Such indirect benefits could result from increased business activity in the area and similar effects. These indirect benefits are difficult to measure in monetary terms. However, they are used to justify irrigation development. The measurement of indirect benefits appears to be arbitrary and questionable.

The Missouri Basin Survey Commission also notes the disparity between costs, benefits and revenues. For example, cost of proposed irrigation is estimated by the agencies from 98 to 109 million dollars annually, including operation and maintenance, compared with direct benefits of 81 million dollars annually and indirect benefits of 132 million dollars. Payments for construction costs by water users, however, may be as low as 12 million dollars annually, *or less than 15 percent of direct benefits claimed.*[8] Another recent report stated: "The examination of present practices and procedures in economic evaluation of water resource projects . . . . has clearly indicated the absence of uniform approach by the different agencies or even a completely consistent approach by the same agency."[9] The same report, in discussing the use of indirect benefits to justify irrigation, stated, "It is the view of the subcommittee that even though those devising these computations may not realize their vulnerability, the higher authorities of the agencies who knowingly approve the use of such dubious factors seem to be deliberately participating in an attempt to mislead themselves if not the Congress and the public at large. The use of such hypothecated benefits in a computation would tend to create doubt in the validity of the entire presentation of the agency."[10]

Tuttle Creek Controversy. Another basic difficulty is symbolized by the "Tuttle Creek" controversy in Kansas. Here the Corps of Engineers have proposed a dam on the Kaw River for flood protection. This dam would inundate a wide fertile

[7] *Missouri: Land and Water*, Missouri Basin Survey Commission, p. 90.

[8] *Ibid.*, p. 98.

[9] *Economic Evaluation of Federal Water Resource Development Projects*, Report to the Committee on Public Works, House Committee Print No. 24, 82nd Congress, 2nd Session, page 51.

[10] *Ibid.*, page 51.

valley and seriously disrupt a well established agricultural community. The local people have opposed the construction of this dam since 1938. The Kansas legislature has employed independent engineering firms to study the proposal and requested that Congress make no appropriations for Tuttle Creek Dam. The Missouri Basin Survey Commission made an independent study and questioned the feasibility of this project. Independent engineering firms have made studies and concluded that the project is not feasible.

The local people favor an alternative means of providing flood protection for Kansas City. The alternatives suggested include a floway through Kansas City, upstream flood protection and zoning in the flood plain. Despite this opposition and suggested alternatives the Corps of Engineers was able to get an appropriation of $5,000,000 to begin construction of the dam.

The local people then intensified their efforts to stop further appropriations. The people in the valley formed an organization to try to tell their story to Congress and the nation. Among other things they produced a film known as the "Tuttle Creek Story," at a cost of approximately $15,000. which was paid by voluntary contributions from the people of the Blue River Valley. The area is traditionally Republican and has had Republican representation in Congress for a long period of time. Despite this strong Republican tradition the people elected a Democrat to represent them in Congress on the grounds that he would oppose the construction of the Tuttle Creek Dam.

The independent studies, the action of the Kansas legislature and the vote of the Congressional district provide a convincing indication that the plan suggested by the Corps of Engineers is not necessarily in the broad public interest. The significant point is that the local people have an alternative plan to provide more effective flood protection at a lower cost yet there is no way of getting adequate public consideration of the merits of these proposals. With present administrative procedures, participation on the part of local people tends to be limited to being either for or against a given project. Opportunity for local participation in the formulation of a plan or the consideration of alternatives is limited. This leads to bitter conflicts which make rational discussion almost impossible. The result is Kansas City continues to be vulnerable to the same kind of flood damage as it experienced in 1951.

The basic difficulty is that we in the Missouri Basin do not have adequate means for formulation of the programs which will result in the most effective use of the resources in the Missouri Basin.

A few more illustrations will help point up the present difficulties. The Bureau of Reclamation built a dam on the Grand River in northwestern South Dakota. The primary purpose of this dam was to provide storage for irrigation. When the dam was complete it was officially recognized that the soil and water conditions were such that the possibility of successful irrigation was very doubtful. A long-range experimental program was established to learn whether water with high salt content can be applied to the land in this area. Sound planning would have required the study of soil and water conditions before construction of the dam.

In another case the irrigation of land in the Bixby unit along the Moreau River in South Dakota was authorized by Congress. Approximately $2,000,000 was spent to build housing for construction workers before it was officially recognized that the salt content of the water was so high that successful irrigation was im-

possible. Construction was discontinued and no further appropriations have been made for this project. Competent soil scientists had pointed out the problems involved in trying to use this water for irrigation. Despite these warnings money was appropriated to build the above mentioned housing. Furthermore, a report was issued showing that the project was economically feasible. How you could have economic feasibility on an irrigation project where irrigation was not possible was not explained in this report.

Under the Flood Control Act of 1944, nearly 5 million acres were proposed for irrigation. About one-half of the new irrigation planned was to be located in North and South Dakota. The report used as a basis for authorizing the Missouri Basin Program in 1944 indicated that more than a million acres would be irrigated in North Dakota and 750,000 acres in the Oahe unit of South Dakota. Costly engineering plans were prepared for irrigation systems in both areas. In 1954 soils surveys are still in progress to determine what soils can be irrigated. Soil survey work is relatively inexpensive and again it seems logical to determine the extent and location of irrigable soils before making plans for canals and distribution systems. The original North Dakota project has been completely abandoned because the soils are not suitable for irrigation. The Bureau of Reclamation is now looking for new areas that can be irrigated. When the soil survey work is completed we may learn that the two large irrigation projects in the Dakotas are not economically feasible.

The construction of the dams is based on the assumption that there will be irrigation. Consequently, some power potential will be lost if irrigation is not feasible because the storage capacity designated for irrigation could have been used for more power production. This type of error can be avoided by making necessary soil surveys before the final engineering designs.

Navigation Issue. Many other issues are of concern to people in the Missouri Basin. For example, the Corps of Engineers has consistently given high priority to navigation possibilities on the Missouri. Many people have questioned the economic feasibility of maintaining a 9-foot channel from Kansas City to Sioux City because of low traffic volume and high cost. After thorough investigation the Missouri Basin Survey Commission recommended that navigation be given the lowest priority for both funds and water and also questioned the economic feasibility of navigation. Prior to the work of the commission the public did not have available reliable factual information on which to base a judgment of this kind.

Coordination between Up-Stream and Main-Stem Flood Control. The question of the proper balance between up-stream flood control and main-stem dams is of vital importance to the orderly development of the basins resources. Up to the present, the public discussion of this issue has centered around an "either" "or" proposition. The Corps of Engineers is mainly responsible for the main stem construction while the Department of Agriculture is mainly concerned with upstream flood control. Each agency has a vested interest in expanding its work. Consequently, there is a tendency for their informational efforts to be directed at promoting the activities of their own particular department of government rather than the more constructive task of formulating a well coordinated program.

Federal, State, Local Relations in Land Acquisition. Some 5,000 families in the Missouri Basin will be required to move

from their homes in reservoir areas. The determination of what constitutes just compensation requires close working relations with these people. Many legal, economic and human relationships are involved. The act of buying these homes and farms is so important to the families involved that the public is duty bound to employ the most equitable methods that can be devised.

Study of the land buying procedures used by the Corps of Engineers indicates there is room for considerable improvement in present methods. Several studies have been made of Army procedures. In each case we find that people whose land is being bought are highly antagonistic toward the government. Also the rate of litigation is high.

The studies made by people in the state colleges have pointed to specific means for improving the land buying procedures. The Great Plains Council has issued two research bulletins which analyze the problem and suggest solutions. The first one entitled *Reducing Adverse Effects of Reservoirs*[11] was based on several studies made in the Missouri Basin and the second, entitled *TVA Land Acquisition Experience Applied to Dams in the Missouri Basin*[12], shows how new techniques developed by TVA proved more satisfactory to the landowners, the government agency and the general public.

Despite this overwhelming evidence that the broad public interest can be served by improving the land-buying procedures, the local people have no way of getting this job done. These small groups can write to their Congressman or Senator. A sympathetic Congressman may communicate with an Army official in Washington but the effect of this communication does not appear to find its way back to the source of the difficulties.

Proposed Solutions

A clearer definition of the above problems indicates that their solution lies in improved organizational arrangements and some changes in national policy. As stated earlier, within the federal government itself various agencies have been given by Congress the authority to accomplish specified basic tasks. With such authority various agencies have assumed jurisdiction over particular aspects of resource development. When jurisdiction has operated to exclude state and local people and other federal agencies—the program has suffered from deficient planning, extended controversies and unresolved disputes. Technical ability has been available. However, this ability has often been purchased at far too high a sacrifice in balanced development and local participation.

There are other serious shortcomings resulting from the lack of a responsible organization. Federal agencies have failed to work together on important issues despite the friendly participation in inter-agency meetings. This lack of coordination has been particularly evident in the important planning stages. This inability to develop coordinated plans is demonstrated by: (1) The Corps of Engineers and the Department of Agriculture failed to work together in the Salt-Wahoo basin of Nebraska. (2) The Corps of Engineers and the Bureau of Reclamation have failed to reach agreement in plans for the James of the Dakotas. (3) In the Osage River Basin in Missouri the breakdown of planning was precipitated by the inability of the part of the Corps of Engineers to work in harmony with the state. The Osceola

[11] John Muehlbeier, *Reducing Adverse Effects of Reservoirs*, Great Plains Council Publication 6, Kansas State College, Circular 293, October 1952.

[12] Kris Kristjanson, *TVA Land Acquisition Experience Applied to Dams in the Missouri Basin*, Great Plains Council Publication 9. South Dakota State College Experiment Station Bulletin 432, August 1953.

Dam was authorized for construction in 1938. It became a center of controversy when it was included in the Pick-Sloan plan in 1944. The local people and the state government opposed the project. To counter this opposition a representative of the Corps of Engineers is reported to have "made an open invitation to the people to put pressure on the state administration and Congress in favor of the proposed Osceola Dam on the Osage."[13] This controversy led to an attempt by the State administration, Department of Agriculture and the Corps of Engineers to develop a coordinated program. A report was prepared but in the final analysis the Corps of Engineers was unable to recommend this coordinated plan because they thought there was some infringement on their flood control functions. In the 16 years since Osceola Dam was first authorized and the 6 years since coordinated planning was attempted, there has been practically no progress in solving the problems of the Osage basin. The significant point is that the state government and local people made a concerted effort to develop a coordinated plan of resource development and were unable to get the kind of program they believe to be most desirable for the conservation of their resources.

Under present arrangements only limited participation is accorded the states and local communities. Ordinarily they are offered an opportunity to review a specific project. But the chance comes late in the planning day after the project has crystallized and has become a part of the program of the sponsoring agency. In addition most states in the Missouri Basin do not have the technical staff required to make a thorough review of the proposal and study of alternative possibilities. Consequently, the state's participation is often limited to the choice of being for or against a given project. This has resulted in the organized opposition in Kansas and Missouri to flood control programs proposed by the Corps of Engineers.

Briefly, the overall problem can be stated as follows: The various federal agencies have authority limited to specific areas of work; these authorities are often overlapping and conflicting. There is no adequate organizational procedure for resolving disputes and when conflicting authorities result in inadequate planning or deficient work the people of the basin do not know who is responsible. The blame for shortcomings in planning and operation is passed between agencies and between Congress and the federal agencies. In short there is no way to hold any one man or group of men responsible for major decisions.

People who study this problem generally agree there is a need for improved organizational arrangements. There is, however, less agreement on the kind of organization required. The major alternatives receiving consideration at present are the Inter-state Compact, the MVA and now the Missouri Basin Commission and Compact Board. If state and local groups are required to pay part of the cost of development, more responsible decisions will result. This principle can be applied under any one of these three organizational arrangements.

Missouri Basin Compact Idea

The Missouri River Basin Compact under consideration by some groups is a compact between the Missouri Basin states and the federal government. It is suggested the compact become effective when ratified by the seven "core" states of Kansas, Missouri, Montana, Nebraska, North Dakota, South Dakota and Wyoming. The three other Basin states—

[13] Report of the Missouri Basin Survey Commission, page 215.

Colorado, Iowa and Minnesota—would also be entitled to full participation if they ratify.

The proposed compact would create a joint agency of the participating governments. Its main purpose would be to integrate and coordinate governmental activities—federal, state and local. The compact board would plan for the orderly development of these resources and recommend appropriate action to the participating governments. Its power to plan and recommend is implemented through the right to review agency proposals for the construction of facilities and the operation of programs.[14]

The compact board is not intended to displace existing agencies and it may not engage in construction or other direct operations. The compact board is charged with "(1) formulating overall plans for the development of the Basin's water and land resources, (2) reviewing proposed construction and operational plans to determine whether such proposals are consistent with the overall plans for the basin's development which the board has approved, and (3) reviewing actual operations to determine whether approved plans are being carried out properly."[15]

Basically the board has power to make recommendations only. It has no legal authority to enforce its recommendations and therefore cannot be held accountable for results. In other words, this board would be similar to the Inter-agency Committee with a little more prestige but no more authority.

The MVA Idea

The proponents of an MVA suggest that the President of the United States should be empowered to appoint a board that would plan, build and operate the public works necessary to the program. Because of the differences in resource development problems in the Missouri Basin and the TVA area, the organizational arrangements would necessarily be slightly different. However, the basic ideas would be similar and for that reason it may be useful to review the TVA idea and discuss its effectiveness in resolving problems similar to the ones we are faced with in the Missouri Basin.

TVA is a government corporation endowed with some of the flexibility of a private corporation. It is headed by a board of three directors appointed by the President and confirmed by the U. S. Senate. A general manager appointed by the board heads the staff of the TVA comprising civil, electrical, and chemical engineers, biologists and experts in other fields. The TVA is dependent upon Congress for annual appropriations required to finance certain activities of public benefit. These are traditional functions of the federal government that do not produce revenues for the TVA. Among these non-revenue-producing activities are navigation and flood control operations; research on fertilizer products and processes; basic agronomic research and the conduct of farm demonstrations; general resource development in the fields of agriculture, forestry and tributary watershed improvement; and general social and economic investigations. Much of this work is carried on in cooperation with state and local agencies.

TVA is fully accountable to the Congress and to the President for what it does and the way it performs its work. This accountability is achieved by full and complete audits of its financial records; by hearings each year before the Bureau of the Budget, acting for the President, and by hearings before the Appropriations Committees of Congress, by review and examination of all of its activities

[14] *Missouri River Basin Compact*, prepared for the Missouri River State Committee by the Council of State Governments.
[15] *Ibid.*

before Congressional committees and by periodic reports to Congress, the president and the public. Equally or more important is the accountability to the people of the region through day by day work with state and local governments in the Valley. TVA personnel know that the support for TVA in Congress must

TABLE I—TENNESSEE VALLEY AUTHORITY: COMPARISON OF ESTIMATES WITH ACTUAL COSTS—MAJOR TVA CONSTRUCTED PROJECTS

Project	Estimates Used for Appropriation Requests		Final Cost From Published Technical Reports		Construction Started
	Amount	*No. Units*	*Amount*	*No. Units*	
Norris	$ 36,025,230	2	$ 30,508,024	2	10– 1–33[1]
Wheeler	32,116,537	2	29,294,720	2	11–21–33[1]
Pickwick	32,529,685	2	29,701,267	2	3– 8–35[1]
Hiwassee	15,250,000		15,922,637	1	7–15–36[1]
Guntersville	29,500,000		31,098,760	3	12–4–35[1]
Chickamauga	31,650,000		33,730,996	3	1–13–36[1]
Kentucky	112,000,000	6	116,302,296	5	7– 1–38[2]
Watts Bar	35,000,000	3	32,976,647	5	7– 1–39[2]
Fort Loudoun	28,500,000	2	34,940,739	2	7– 8–40[2]
Cherokee	34,500,000	3	29,765,267	2	8– 1–40[3]
Douglas	30,500,000	2	39,496,985	2	2– 2–42[4]
Fontana	48,000,000	3	69,043,688	2	1– 1–42[4]
Chatuge	10,000,000		7,036,589		7–17–41[5]
Nottely			5,379,709		7–17–41[5]
Ocoee No. 3	6,600,000	1	7,988,050	1	7–17–41[5]
Apalachia	20,000,000	2	22,558,532	2	7–17–41[5]
Watts Bar Steam	18,200,000	4	18,866,876	4	8– 8–40[6]
Watauga	28,900,000	2	31,541,053	2	7–22–46[7]
South Holston	30,650,000	1	30,522,504	1	8– 4–47[7]
Additional Units	18,000,000	6			
Subtotal	$597,921,452	41	$616,675,339	41	
Boone	27,500,000	3	27,526,305	3	7– 1–50[8]
Fort Henry	14,500,000	2	14,009,317	2	5– 1–51[9]
Johnsonville	98,000,000	6	93,183,507	6	5–12–49[9]
Widows Creek	103,000,000	6	95,500,000	6	3–29–50[9]
Grand Total	$840,921,452	58	$846,894,468	58	

Source of Estimate: [1] TVA Formal Report to Congress—March 1936. [2] Independent Offs. Appr. FY 1939, Page 919; FY 1940, Page 1720; FY 1941, Page 1622, respectively. [3] Deficiency FY 1941, Page 2. [4] 2nd Supplemental FY 1942, Page 17. [5] 1st Supplemental FY 1942, Page 11. [6] Independent Offs. Appr. FY 1943, Page 850. [7] Government Corporations FY 1947, Page 927; FY 1948, Page 31, respectively. [8] Independent Offs. Appr. FY 1951, Page 986. [9] Independent Offs. Appr. FY 1952, Page 552.

The above shows an overrun of $5,973,016 on estimated costs of $840,921,452 or approximately 0.7 percent.

The upper section down to the subtotal duplicates the tabulation printed in the Senate Hearings on TVA's Appropriation for fiscal year 1951 on page 1067 except that final costs have been inserted instead of the estimates for Watauga and South Holston. In this section the item "additional units" represents the addition of six generating units at an average price of $3,000,000 per unit to the estimate column to equalize the number of generating units in both columns.

In the footnotes "source of estimates" (except for those used from TVA's 1936 Report to Congress), the references are to the estimates contained in the House Committee Hearings at the time funds were requested to begin construction, except, where additional generating units have subsequently been added, the reference is to the total project cost proposed at the time funds were requested for the additional units.

come from people in the Tennessee Valley. They know that unless they can resolve conflicts of interest within the region and present an integrated program which is supported by the people of the region they will fail.

TVA Financial Accounting. The TVA methods for cost estimating, accounting and cost allocations have been far superior to those used in the Missouri Basin. In comparing the cost estimates presented by TVA to Congress with the actual costs we find a high degree of accuracy. Actual costs averaged less than 1% above the estimated costs (Table I) on most of the projects. This is a remarkable record in view of the fact that estimates made by other federal agencies are often in error by more than 100%. It is also noteworthy that the accuracy of cost estimates was maintained during periods of changing prices.

The question of cost allocations was resolved in the early stages to the satisfaction of all interested parties (Table II). The method used by TVA is worth noting. They divided the investment of multi-purpose projects into two classes for purposes of allocation: (1) The investment in facilities used for a single purpose such as power houses and generators provided for the production of power, sluiceways and portions of reservoirs to maintain flood control storage, or locks and river channel improvements provided for navigation. These costs are charged in their entirety to the purpose served. (2) Investment in facilities which serve more than one purpose, such as dams and the major portions of reservoirs. These costs are common to several purposes and so are divided among the purposes served. The allocation of the investment as of June 30, 1953 in multiple-purpose projects and the allocation of the total system investment including single-purpose projects and other electric plant is shown in tables II and III.

TABLE II—Allocation of Investment in Multiple-Purpose Projects

	Allocation of Common Costs			Total	
Purpose	Direct Costs	Percent	Amount	Amount	Percent
Navigation	$ 45,934,051	27.0	$110,646,189	$156,580,240	21.8
Flood Control	55,367,000	31.0	127,038,217	182,405,217	25.4
Power	207,649,707	42.0	172,116,294	379,766,001	52.8
Total	$308,950,758	100.0	$409,800,700	$718,751,458	100.0

The significant point is that TVA did resolve these problems of cost allocation very shortly after the program was started while the other federal agencies have not yet reached agreement on a reliable method for cost allocations. These agencies have now agreed that several methods are acceptable but it is questionable whether they can agree on one method and also reach agreement on estimates of costs and benefits needed to apply any one method.

Responsibility for Technical Decisions. During the 21 years of operation TVA has been relatively free from criticism or errors of professional technical judgments.

TABLE III—ALLOCATION OF TOTAL SYSTEM INVESTMENT

Purpose	Allocated Investment in Multiple-Purpose Hydro Projects	Single-Purpose Hydro, Steam-Electric, and Other Electric Plant	Total	
			Amount	*Percent*
Navigation	$156,580,240	—	$156,580,240	12.4
Flood Control	182,405,217	—	182,405,217	14.4
Power	379,766,001	$544,747,489	924,513,490	73.2
Total	$718,751,458	$544,747,489	$1,263,498,947	100.0

Those who study the accomplishments of TVA do not find any evidence of major errors in planning. The reasons for this success are well stated by Senator Hill of Alabama who was a member of the House committee that helped draw up the TVA Act. In a recent statement he said:

"We sought in the original act to give to one agency responsibility for Federal leadership in the development of all the resources of one river valley, to locate its management in the region, close to the problem and out of Washington, to make it responsible directly to the President and to the Congress. Those were new ways to approach the age-old task of trying to develop wisely and fully the resources of nature for the well being of man.

"We tried, in creating a Government corporation, to free TVA, insofar as a public agency can be freed, from red tape, from the ailments of bureaucracy. We tried to couple authority with responsibility so that we could hold the Board accountable for results. We tried to eliminate the chance for buck passing for the alibis which prevent the fixing of responsibility and frustrate accomplishment in the traditional fragmentation of Federal programs. We set out *specific goals for TVA* to accomplish but we left *to management* determination of the *way* to do it."[16]

This delegation of responsibility to the Board and the selection of highly competent personnel has resulted in a sound program of resource development.

Federal-State-Local Cooperation in TVA Area. The TVA cooperation with local units of government is perhaps best exemplified by the manner in which they discharge their responsibilities in the field of electric power. The TVA produces large quantities of power. Its power function in the main is limited to the generation and transmission of electrical energy with delivery of power at wholesale to the lines of distribution agencies who in turn serve the ultimate consumers.

The TVA Act prescribed that preference be given to states, counties, municipalities and cooperative organizations of citizens or farmers not organized or doing business for profit, but primarily for the purpose of supplying electricity to its own citizens or members. The Act also provides that power be sold "at the lowest possible rates . . . . to encourage increased domestic and rural use of electricity."[17]

"The states in the area enacted special legislation authorizing their cities to establish municipal systems and to enter into power

[16] U. S. Congress Senate, Second Independent Offices Appropriations for 1954. Hearings before Subcommittee of the Committee on Appropriations: 83rd Congress, 1st Session on H.R. 5690 (Washington: Government Printing Office, 1953), pages 421-422.

[17] Act of May 18, 1933, Section 10-11, 48 Stat. 64-65.

contracts with the TVA. Most of the cities now distributing TVA power held referenda to decide whether to enter into a contract with TVA. The legal arrangements developed in Mississippi and Alabama for the rural distribution of TVA electricity through consumer cooperatives set the pattern for state enabling acts which later accommodated rural electric cooperatives in most of rural America. Today, TVA electricity is being distributed to consumers over almost the whole of the State of Tennessee and in parts of six neighboring states by 97 separate municipal power systems, 51 rural electric cooperatives and two small systems in private ownership."[18]

This cooperative arrangement for the production and distribution of electric power requires constant consultation and negotiation with state and local governments.

Because there is always the question of who should get the benefits from a program of this kind, conflicts of interest inevitably arise. These conflicts must be resolved within the broad framework of the public interest in the largest sense of the term. The TVA has been effective in resolving these conflicts. In the first twenty years of operation only two legal actions were necessary to resolve basic conflicts of interest. This indicates that various municipal, cooperative and other groups engaged in the purchase and distribution of TVA power were able to reach agreements with TVA which were satisfactory to them.

Payments in Lieu of Taxes. Another illustration of how TVA has worked with state and local groups is found in the procedure they developed for making payments in lieu of taxes. When TVA bought property from power distributors the property was removed from the state and local tax rolls. The land required for reservoirs also removed some land from the tax rolls.

[18] Gordon R. Clapp—"TVA and the States," address presented at the University of Chicago, February 22, 1954.

The formula in the original TVA Act for payments in lieu of taxes to states and counties was not satisfactory. It was recognized that a change was needed. The question of the division of monetary returns was of vital concern to representatives of county, state and national government. On the basis of two visits to the TVA area and extended interviews with landowners, county and state officials, lawyers, judges and others, I believe the following account of this process to be a more accurate account than I can write.

"A careful study began. With the facts in hand, meetings with governors, tax and finance commissioners, and county magistrates appraised the analysis and negotiated a proposal to be submitted to the President and the Congress.

"In these negotiations the counties pressed for the highest possible payments that could be extracted from the power revenues of the TVA. The states were interested in the financial needs of the counties, to be sure, but they also had their own budgetary problems —they wanted their share. At the same time TVA and the others were aware of the mounting benefits accruing to the area through the TVA power system. New dams, employment, new lakes with great recreation possibilities, and new industry were increasing the property value and the tax base within the states and counties. And TVA's revenues are an asset to the federal government providing a return on the investment made in TVA by the nation's taxpayers.

"The TVA, therefore, had to face two ways—to assure an equitable adjustment to the states and counties and of the federal taxpayers' rightful expectation of a return on their investment in the TVA power system. Moreover, TVA was in the middle in a negotiation going on among the states and counties about how the total TVA tax payments would be divided between the two.

"In the hearings and debates in Congress interesting inconsistencies developed. Some representatives from outside the Tennessee Valley urged that TVA be required to pay more to the states and counties in spite of the fact such payments would reduce the amount TVA would otherwise pay into the general funds of the United States Treasury. Governors and county magistrates were somewhat

puzzled by this concern for their welfare until they realized that the private utilities were trying to load TVA's in lieu of tax payments in order to break the TVA wholesale and resale rates for electricity. Others inside and outside the area argued that the new plan would pay too much to the states and counties.

"But the amendment as passed incorporated the plan as developed by negotiation and study in the region. The facts and the careful process of negotiations survived an extremely close scrutiny by the Congress and was judged to be fair to electric consumers, states, and counties of the region, as well as to the nation's taxpayers."[18]

This is in contrast to the Missouri Basin situation where each federal agency has a different method for making payments in lieu of taxes. Some agencies make no payments. Others pay an arbitrary percentage of rental returns on lands held in reservoir areas. In no case have we made a thorough study of the problem to determine how the needs of the state and local communities can be met most effectively within the broad framework of the national interest.

Basic Lessons. The effectiveness of the TVA approach to resource development indicates that we can use many of their ideas for resolving problems in the Missouri Basin. The most basic idea is that decisions are improved if a definite individual or group is held accountable. This was accomplished by establishing the TVA Board with fairly broad discretionary powers.

The Missouri Basin covers a vast area and the problems in the upper basin are essentially different from those of the lower basin. The people in the upper basin are primarily interested in the maximum production of power. They are also interested in the development of irrigation in areas where this is feasible. On the other hand people in the lower basin are primarily interested in flood control, municipal water and recreational development. Neither group is particularly interested in navigation.

This means that these two major groups have conflicting but related interests in the management of the water in the Missouri River. Also as we have pointed out earlier there are very real conflicts of interest within these two major groups. It seems logical therefore to establish an administrative device which can effectively resolve some of these conflicts on the local level. One possibility is to establish a 3- or 5-man board appointed by the President with the authority and responsibility for the planning, construction and operation of the land and water development program in the Missouri Basin. The Missouri Basin Board would be responsible for control of the river. State and local groups would assume responsibility for the administration of irrigation and other local districts required to operate and maintain the works of improvement in their state. Contracts for the use of water from navigable streams would be negotiated with the Missouri Basin Board. This arrangement would insure the maximum local participation and at the same time provide accountability for the success or failure of the entire program.

Missouri Basin Commission and Compact Board

Senator Hennings of Missouri has recently introduced a "bill to establish a Missouri Basin Commission and Compact Board to provide coherent and unified direction for the development of the Missouri Basin's natural resources, to give responsible direction to the development activities of the Federal Government in the Missouri Basin, and for coordinating those activities with resource development activities of the States."[20]

[18] Gordon R. Clapp, "TVA and the States," address presented at the University of Chicago, February 22, 1954, page 17.

[20] Senate Bill 3325, 83rd Congress, 2nd Session.

The proposed Commission is to be composed of five members appointed by the President and with the advice of the Senate from a list of 30 names submitted by the states. The term of office of each member is nine years. In addition the Missouri Basin States are granted the right to negotiate an interstate compact which will become effective when ratified by the legislatures of the seven states of the 10 basin states. The Compact Board thus created is given broad powers for review and consultation with the Commission.

The general authority of the Commission is spelled out as follows:

"The Commission shall have authority for the direction, coordination and control of overall activities of the federal government within the Missouri Basin relating to the development of the resource potential of such basin in general, and in particular to activities relating to watershed management and land conservation, flood control, forestry, irrigation, electric power, domestic and industrial water supply, navigation, etc. . . . . and shall exercise general supervision, direction and control with respect to any other activity of any Federal agency involving functions under the authority and control of the Commission (including but not limited to the Corps of Engineers, Department of the Interior, Department of Agriculture, Department of Commerce, Public Health Service and Federal Power Commission.) This authority is modified by the requirement that all major plans or proposals be reviewed by the Compact Board. If agreement between the Commission and the Board cannot be reached on a mutually acceptable program within two years from the submission of the initial Commission recommendations, the Commission may submit its proposal to the President and the Congress along with the specific recommendations of the Compact Board, accompanied by a full statement of the issues in dispute."[21]

Under this plan the various federal agencies would continue to have responsibility for a specific phase of the resource development program but under the direction of the Commission. This would enable these agencies to continue to solicit support from their special clientele. In the event of disagreement between a strong federal agency and the above-named Commission a resolution of this conflict would be most difficult. This is the most basic weakness in the Hennings proposal. A Commission of this kind can be expected to have difficulty in coordinating the activities of several large federal agencies that have built up strong pressure groups to support their specific interests.

[21] Senate Bill 3325, 83rd Congress, 2nd Session.

Summary

In summary then, it is clear that ten years of experience with the multiple-agency approach to resource development in the Missouri Basin has *not* been satisfactory. Many problems of unresolved conflicts exist which hamper the maximum development of the land and water resources of the area.

It is also clear that twenty-one years of experience with the TVA indicates that this new administrative device has been very effective in resolving conflicts of interest for the mutual benefits of the groups affected.

The experience of TVA indicates the advantages of an administrative authority which can assume responsibility and can be held accountable for results.

The Missouri Basin involves a large area with complex problems and real conflicts of interest. It seems necessary to develop some administrative device adapted to the region in order to deal effectively and satisfactorily with these problems and conflicting interests. Such a device necessarily involves placing administrative authority with some one or some group which can be held accountable for results.

Reports and Comments

Excess Farm Population and the Loss of Agricultural Capital†

I

AGRICULTURAL economists have long identified the imbalance between the labor and capital factors in agriculture as one of the major causes of the relatively low incomes of farm people. The accepted analysis runs about as follows: The labor-capital mixture in agriculture, particularly in the South, is high on labor and low on capital with the result that the marginal physical productivity of labor in agriculture is relatively low. The income elasticity of demand for farm products is assumed to be very low at present levels of national income. Increases in per capita real incomes are not expected to be large enough, when coupled with this low income elasticity of demand, to lead to substantial increases in consumption of farm products. Total population growth, therefore, is the only significant dynamic element in the domestic demand for agricultural products. Hence, if labor-replacing technological development keeps pace with total population growth, the marginal value productivity of agricultural labor is, in a secular sense, extremely low. If, as has apparently been the case for the last several decades, labor-replacing technological advance outstrips total population growth, then the aggregate economic earnings of labor in agriculture will perforce decrease, and a reduction in size of the over-all agricultural labor force is necessary to the establishment of equilibrium between the per capital earnings of labor in agriculture and in the rest of the economy.

In the face of this need for a gradual reduction in the total agricultural labor force, farm family births far exceed replacement requirements. (The accepted fact that farm birth rates are substantially higher than urban birth rates is not the relevant point here. Rather, the relevant point is the excess of farm births over replacement needs—as determined in part, to be sure, by nonfarm population growth rates.) Consequently, heavy off-farm migration—at least in terms of employment if not residence—is necessary and has in fact been going on.

All this has become commonplace knowledge to agricultural economists. Furthermore, several important implications of the process have been identified. Of foremost importance has been the obvious fact that since population migration is not a frictionless process, substantial disparities between farm and nonfarm incomes are almost inevitable for as long as the above relationships hold. The labor-capital imbalance mentioned earlier is, therefore, a concomitant of the twin factors of a production of an agricultural labor supply in excess of replacement needs and frictions in labor migration processes.

The above review has been sketched out to provide the context for this paper, which attempts to identify another important implication of these relationships. The evidence to be presented in this article deals with the depletion of agricultural capital resulting from investments made by farm people in the rearing of more children than are needed to keep agricultural labor earnings in equilibrium with earnings in the rest of the economy. The hypothesis is that the production of an agricultural labor surplus creates an imbalance between the capital and labor factors not only by causing a surplus of labor in agriculture but also by draining capital out of agriculture. The capital drained out is in the form of investments made by farm people in rearing children in excess of replacement needs.

The case is clear for those of this "surplus" farm-reared population who actually migrate

† The writers appreciate the helpful suggestions of several colleagues, especially R. B. Hughes and R. G. F. Spitze who served on the committee for the junior author's thesis, upon which this article is based. This thesis, entitled *An Excess Farm Population and the Loss of Farm Wealth*, is on file in the Library of The University of Tennessee.

from agriculture to nonfarm areas, especially if they migrate before they are old enough to have been long in the labor force.[1] Capital invested by parents in food, clothing, health and education of these youths—and hence not available for other productive uses—leaves the farm with the youths and is "disinvested" off the farm.

Although not quite so obviously, it is also certain that under the present conditions of American, and particularly Southern, agriculture outlined earlier in this article, most of the capital invested in rearing such population surpluses is unproductive in agriculture even though these people do not leave farming. This is due to the low productivity of agricultural labor. And capital so invested is not available for other productive uses, whether or not the children subsequently migrate. To sharpen the argument, the implications of the foregoing can be restated in four propositions: (1) Farm people are annually rearing a population in excess of agriculture's needs. (2) A large proportion of the farmers' earnings (which average substantially lower than those of nonfarm people) are invested in rearing this excess population, thereby reducing the amount available for investment in nonhuman resources. (3) A large part of the investments in the children made annually by people in farm communities does not yield the communities any return because these children cannot, on maturity, be employed profitably in farming. (4) As a result of these and generally recognized capital rationing conditions, farm people have difficulty accumulating sufficient capital to achieve a proper organization of their resources and a proper balance of capital and labor.[2]

II

With the analytical context thus established, the next step was to determine the magnitudes of this capital depletion process for the state of Tennessee. This determination involved two estimates: (1) the rate at which the agricultural population is producing an excess over its needs as measured by the rate of out-migration, and (2) the average size of the investment made in each farm-reared person. The following is the procedure by which these estimates were made.

Two parameters were considered as a basis for estimation of the magnitude of out-migration of farm population. First, the net natural increase in the rural population for the year 1949 was calculated. (1949 was chosen as that was the year for which the data, to be presented subsequently, were collected.) The number of births over deaths was used as the measure of the net natural increase in the rural population.[3] The resulting figure, 33,013, was then multiplied by the percentage that the rural farm population is of the total rural population. For Tennessee, this percentage was 50.2.[4] As the fertility ratios for these two groups were nearly equal (498 for rural farm and 505 for rural nonfarm the 50.2 percentage) figure was used without further correction.[5] This portion of the surplus farm population, represented by the net natural increase, was thus calculated to be 16,573 for the year 1949.

The remaining portion of the surplus farm population is the yearly change in absolute numbers of farm people. Since these data are available only for census years, the average yearly change for the 1940-1950 decade was used to represent the change for the year 1949. The average yearly change in the total farm population for this decade was a decrease of 25,574.[6] The net natural increase added to this average yearly change in the farm population gives us an estimate of 42,147 as the number of people who left Tennessee agriculture in the year 1949. This we used as our measure of population "surplus."

Admittedly, out-migration is not a perfect measure of surplus farm population. It would be especially inadequate in times of depression when many people are unemployed as it has been shown that in the past, under such conditions, the off-farm movement of people is greatly reduced or even reversed. But for present purposes this

[1] Erven J. Long and Kenneth H. Parsons, *How Family Labor Affects Wisconsin Farming*, Wisconsin Research Bulletin No. 167, May 1950, especially page 9.

[2] Theodore W. Schultz, "Capital Rationing, Uncertainty, and Farm Tenancy Reform," *Journal of Political Economy*, June 1940; also M. Kalecki, "The Principle of Increasing Risk," *Economica*, November 1937, pp. 440-447.

[3] *Statistical Abstract of the United States 1952* (Washington: Government Printing Office, 1952) Table 66, p. 64 and Table 75, p. 71.

[4] U. S. Department of Commerce, Bureau of the Census, *1950 United States Census of Population, Tennessee, General Characteristics* (Washington: Government Printing Office, 1952).

[5] *Ibid.* This fertility ratio measures the number of children under five years old per one thousand women between the ages of fifteen to forty-nine years.

[6] *Ibid.*

measure would seem adequate when applied to conditions such as those prevailing in the 1940-1950 decade, when our economy was operating at or near the full employment level and significant population adjustments were taking place. In any event, the number of migrants (or those changing by Census classification from farm to nonfarm occupations) is a very conservative measure of this population surplus. It is conservative in the sense that only those reporting changes in their occupation or location are assumed to be surplus. This seems unlikely inasmuch as the incomes of farm people remain relatively low.

The estimate of the size of the investment involved in rearing a child from infancy to an age where he can join the labor force was derived from analysis of interview schedules obtained by the College of Home Economics for other purposes.[7] Eligibility requirements of families from whom schedules were taken were as follows: White operator of a farm raising $400 worth or more of farm products in 1949 who lived on the same farm January 1, 1949 and at the time of interview, owned the farm in part or in full on December 31, 1949, lived in the farm dwelling he owned, and was one of the co-heads of the family as well as owner-operator of the farm. A further requirement was that the family had to be a husband-and-wife family which was in existence January 1, 1949 with no children or only unmarried children under 22 years of age living at home at the time of the interview and during the report year.[8] All families and farms not meeting these requirements were excluded from the study. The sampling rate was set at .75 percent of all white owner-operators of farms in Tennessee for the year 1949 who met the eligibility requirements specified. This sampling rate and these eligibility requirements yielded 331 schedules, of which 213 represented families with children and were used as the sample for the the present analysis.

A summary of the estimates of investments made in farm children, obtained from analysis of this sample of Tennessee farm families, is given in Tables I, II and III. The tables differ from each other in that they represent families of different income levels.

Disposable net cash income was used as a criterion of classification in the tables and consists of net cash farm income, net earnings from other employments, net income from crafts and boarders, net rent from property, net income from interest and dividends, and regular contributions from persons not in the family, less federal and state income taxes. The sample was divided into three income categories which provided an approximately equal number of cases in each group.

The number of children in each group was not sufficient to permit a breakdown by single years, therefore, the children were grouped by five year age intervals. Within a given family income category, the various items of expenditure for the year were re-recorded separately for children in the 1 through 5, 6 through 10, 11 through 15, and 16 through 21 age groups. The sum of each of these expense items for each age group was then divided by the number of children in that group. This was taken to represent the average yearly expenditure on this item for children of this age group who were members of families with the given income characteristics. This figure was then multiplied by five (six in the case of the 16 through 21 age group) and recorded in the tables. Allowance for interest and death losses were computed on the basis of these reported expenditures.

Food was reported by families as total expense for purchased foods and total value, at farm prices, of farm produced foods. The value of food consumed was reported on a family, rather than an individual, basis; the allocation to individual family members was accomplished through the use of previously established "adult male equivalent food consumption units."[9]

[7] A Research and Marketing Act project, entitled *Rural Spending Ways*, sponsored jointly by the Tennessee Agricultural Experiment Station and The College of Home Economics, The University of Tennessee, under the direction of Dr. Josephine Staab.

[8] Josephine Staab, *Income-Expenditure Relations of Farm Families Using Three Bases of Classification*, unpublished Ph.D. Thesis, The University of Chicago, March 1953. Chapter II.

[9] Louis I. Dublin and Alfred J. Lotka, *The Money Value of a Man*, (Revised Edition, New York: The Ronald Press Company, 1946) Chapter IV, p. 50, Table 13, quoting Faith M. Williams and Alice C. Hanson, *Money Disbursements of Wage Earners and Clerical Workers in Eight Cities in The East North Central Region. 1934-36*, Bulletin No. 636 U. S. Department of Labor Statistics, Table C, p. 432 and Table D, p. 433.

According to this system, an adult male is considered as 1.00, an adult female as .82, a one year old of either sex as .48, a ten year old male as .84, a ten year old female as .76, etc.

TABLE I—Estimated Cost of Rearing A Child To Specified Age, for Tennessee Farm Families[a] with Disposable Net Cash Incomes of Under $1250: By Four Selected Age Periods of the Child and By Item of Expenditures; 1949 Price Level. (No. of Families = 73; No. of Children = 203; Average Disposable Net Cash Income = $813.)

Age of Child	Value[b] of Food Consumed	Expenditure for Clothing	Expenditure for Recreation	Expenditure for Education	Expenditure for Medical Care	Expenditure for Personal Items	Allowance for Loss by Death	Total Cost Excluding Interest Charges	Allowance for Interest on Expenditure at 2%	Total Cost Including Interest Charges
5	$ 500	$ 75	$ 20	$—	$ 85	$ 10	$19	$ 709	$ 40	$ 749
10	1100	230	40	25	110	25	25	1565	167	1732
15	1925	440	65	70	140	45	35	2720	414	3134
21	2939	848	119	130	236	111	68	4451	928	5379

[a] See eligibility requirements stated in the text.

[b] The value of food consumed is made up of both purchased food and the value of farm-produced food. Food purchased represents 38.2 percent of the total and the value of farm-produced food represents 61.8 percent of the total.

TABLE II—Estimated Cost of Rearing A Child To Specified Age, for Tennessee Farm Families[a] with Disposable Net Cash Incomes of $1250-2199: By Four Selected Age Periods of the Child and by Item of Expenditure; 1949 Price Level. (No. of Families = 71; No. of Children = 173; Average Disposable Net Cash Income =$1746.)

Age of Child	Value[b] of Food Consumed	Expenditure for Clothing	Expenditure for Recreation	Expenditure for Education	Expenditure for Medical Care	Expenditure for Personal Items	Allowance for Loss by Death	Total Cost Excluding Interest Charges	Allowance for Interest on Expenditure at 2%	Total Cost Including Interest Charges
5	$ 605	$105	$ 35	$—	$ 105	$ 20	$24	$ 894	$ 51	$ 945
10	1415	330	115	35	160	50	32	2137	220	2357
15	2440	610	160	100	205	85	45	3645	552	4197
21	3808	1072	238	196	259	169	88	5830	1232	7062

[a] See eligibility requirements stated in the text.

[b] The value of food consumed is made up of both purchased food and the value of farm-produced food. Food purchased represents 44.5 percent of the total and the value of farm-produced food represents 55.5 percent of the total.

TABLE III—Estimated Cost of Rearing A Child To Specified Age, for Tennessee Farm Families[a] with Disposable Net Cash Incomes of $2200 and Over: By Four Selected Age Periods of the Child and By Item of Expenditures, 1949 Price Level. (No. of Families = 69; No. of Children = 192; Average Disposable Net Cash Income = $3180.)

Age of Child	Value[b] of Food Consumed	Expenditure for Clothing	Expenditure for Recreation	Expenditure for Education	Expenditure for Medical Care	Expenditure for Personal Items	Allowance for Loss by Death	Total Cost Excluding Interest Charges	Allowance for Interest on Expenditure at 2%	Total Cost Including Interest Charges
5	$ 665	$140	$ 35	$—	$155	$ 25	$ 28	$1048	$ 59	$1107
10	1570	400	100	30	255	65	37	2457	255	2712
15	2650	725	175	100	300	100	52	4102	632	4734
21	4060	1415	289	226	396	196	102	6684	1407	8091

[a] See eligibility requirements stated in the text.

[b] The value of food consumed is made up of both purchased food and the value of farm-produced food. Food purchased represents 52.7 percent of the total and the value of farm-produced food represents 47.3 percent of the total.

Clothing and education expenditures were reported separately for each individual in the family. Recreation, medical, and personal expenditures were reported for individual family members as far as these expenditures could be so identified; however, a minor proportion of these expenditures were reported for the family as a unit. In these cases this total was allocated equally among all family members.

Death losses were computed by taking the cost of rearing a child to a specified age times the expected mortality at that age.[10] This cost was then divided by the expected survivors to that age. There was virtually no insurance against these death losses to compensate for the investments made up to that time. Interest charges on the expenditures were computed at two percent, compounded semi-annually.[11]

Family overhead expenses were not included as a cost of rearing the child. Overhead expenses include such cost items as house rent, household furnishings, and household operation which, in turn, includes such items as fuel, light, refrigeration, and telephone. Exclusion of family overhead expenses seemed justified on the ground that, within a given income level, these expenses were about the same for all families. In fact, indications from the data are that overhead expenses per family tend to decline as families grow in size. Apparently the larger families cannot afford to spend as much for these items.

One item of family expenditure whose value in dollars and cents could not be determined is the service rendered by the mother in rearing the child. In the majority of homes, the mother gives a full working day to home occupations of one kind or another. A large share of her time is spent on behalf of the children. It is probable that either by farm or off-farm work she might make a larger contribution to the capital assets of the farm if she had a smaller family. An evaluation of this has not been made and we must be satisfied with pointing out the fact.

Finally, above and beyond these expenditures borne directly by the families are certain expenditures borne only indirectly by the families in the form of public tax funds. There are, no doubt, certain costs shared by the community as a whole with regard to such items as medical care and recreation. These items were considered to be of minor importance and have not been incorporated into this analysis. Perhaps the largest item of this kind is the support of the educational system. As nearly as can be determined from data available, the farm people of Tennessee spend approximately $20 per child per year for education out of locally collected taxes.[12]

III

A principal purpose of the above analysis has been to attempt an estimate of the magnitudes of the aggregate capital transfers from agriculture brought about by its production of population surpluses. Any such estimate must necessarily be crude because of the complexities of the relationships and limitations upon information. One strategic gap is in data on the *age* of migration. If sizeable numbers of people migrate during childhood as members of migrating families, then the investment made in them would be relatively low. If Census reports of 25 years as the median age of all rural and urban migrants were applicable, we would still need to know the frequency distribution by ages to have an adequate basis for making the estimates of capital transfers. The estimated population surplus for the year 1949 undoubtedly included people of widely varying ages. However, available evidence on migration suggests that the bulk of the off-farm migrants are young people.[13] For this reason, the writers chose the investment made in rearing a child to age 15 as the figure to use in computing aggregate capital loss to agriculture. Thus an error is assuredly in the conservative direction. This also eliminates any necessity for making adjustment for any possible "disinvestment" in agriculture before the youths left farming.

Also, as comparisons of the three tables reveal, investment per child increases with increases in income levels of the parents. The writers feel that expenditures reported in

[10] *Statistical Abstract of the United States 1952, op. cit.*, Table 82, p. 77.

[11] Interest was computed from standard annuity tables.

[12] Based on data obtained from State of Tennessee, Department of Education, *Annual Statistical Report for the Scholastic Year Ending June 30, 1950.* The measure used was: Total revenue receipts from the county for county public schools, grades 1 through 12, minus county school funds appropriated to city and special district schools, divided by net enrollment in all county schools, grades 1 through 12, white and Negro. The $20 represents an average for 26 primarily rural counties in Tennessee.

[13] See Dorothy Swaine Thomas, *Research Memorandum on Migration Differentials*, Social Science Research Council. Bulletin 43, 1938, p. 11.

Table I, of families with incomes under $1,250, are more representative of expenditures made by the parents of persons who migrate from Tennessee agriculture than would be, for example, the average expenditures of all farmers in the sample. Inasmuch as the sample was limited to white, owner-operator families whereas migrants from the state include children of tenant farmers as well as owners, and Negroes as well as whites, this lower income group in the sample (with an average disposable net cash income of $813) perhaps reasonably well represents the families of migrating persons.

With these considerations in mind, the writers have chosen the expenditures made *by families in the under $1,250 income group on rearing their children up to the age of 15 years* as representative of average investments per child for all off-farm migrants in the State. The average investment figure used, therefore, was $3,134. As improvements are made in information on the ages of migrating persons, the computations can be adjusted accordingly. Also, there is some possibility that investments per person, although varying from state to state in overall averages, may be a reasonably constant function of income. If so, perhaps useful estimates can be made on a broader geographic basis, such as for the southeastern region. Therefore, data on expenditures by the higher income groups and on rearing youth to age 21 are included in the report, although they are not used as the basis for making the aggregate estimate.

We come now to the estimate of the aggregate capital drain on Tennessee's agriculture resulting from the production of excess population.

Using the foregoing calculations, the wealth represented by these migrants would be estimated at 42,147 x $3,134 or a total of $132,088,698. This represents the expense borne directly by the families. Added to this would be the community expense of education. On the assumption that the average migrant had an eighth grade education, $20 per child per year for eight years would result in a $160 expenditure per person. An estimate of the indirect family or community expenditures would be 42,147 x $160 or a total of $6,743,520. Thus the total of loss wealth to Tennessee farmers as a result of having reared this excess population would be estimated at $138,832,218 for the year 1949. The number of farms in Tennessee in 1950 was reported as 231,631.[14] This represents, therefore, an average loss per Tennessee farm of about $600 for the year 1949.

No attempt will be made in this article to trace out the implications of this capital drainage process and the consequent "subsidization" of nonagricultural by the more agricultural areas of the country. The process operates like sheet erosion—silently, steadily and inconspicuously—whereas some of the reverse processes are extremely conspicuous and the object of popular attention and discussion. Perhaps such counter processes as income subsidies to farm people through price supports, governmental programs to reduce capital rationing in agriculture, and even aggregate capital transfers from the relatively industrialized urban to the relatively unindustrialized rural areas of the country can be seen in more accurate perspective against the background of this process of capital transfer out of agricultural regions. In the matter of aid to rural education, for example, the problem may be quite well handled by state aid programs in states where the farm to nonfarm migration does not result in significant net migrations out of the state. In such cases the capital invested in human agents can be captured as a tax base within the state for partially compensating rural communities for their investments. But in states such as Tennessee from which substantial net cut-migrations occur, the "subsidy" is to other regions of the country and so becomes a problem of broader scope than can be met entirely by state action. Similarly, deeply felt though perhaps often poorly formulated reactions to this process is perhaps one explanation of the great interest of southern states in local industrial and commercial development, rather than out-migration, as the solution to their problems of finding satisfactory employment for the surpluses of population being produced each year in these highly rural states.

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[14] *Statistical Abstract of The United States 1952, op. cit.*, Table 695, p. 574.

An Appropriate Unit for Measuring the Urban Economic Base

AN important and as yet unsettled question pertaining to the mechanics of the urban economic base is the choice of an appropriate unit of measurement. In a recent article[1] Professor Richard B. Andrews has presented a valuable discussion of many possible choices, including, among others, employment, payrolls, value added, and physical production. There is little doubt that these several measures are relevant to an understanding of the role of various industries in an urban area. Nevertheless, his recommendation that the economic base be measured according to all possible criteria may well leave something to be desired from the viewpoint of the prospective empirical researcher. The question of which criterion "really" measures the *quantitative* contribution of each industrial segment still exists.

The primary purpose of this paper will be to show that once the urban economic base has been defined in specific terms, a decision can be made as to the most appropriate unit for measuring the total size of the base and the contribution of each segment of the economy to that total. Other possible units of measurement, far from being discarded, can serve to provide a *qualitative* description of the base. While different definitions of the urban economic base would lead to different appropriate units of measurement, the ramifications of only one definition will be spelled out below.

The feasibility of obtaining the data necessary to implement the resultant method of measurement will also be discussed briefly. In addition, a few comments will be included on interpreting the significance of the total size of the base, once it has been determined.

For the purpose of finding an appropriate measuring unit, the urban economic base will be defined as that set of activities which *earns exchange credit* for the area by way of export sales of goods and services. With this definition in mind, several possible units of measurement will be selected and their adequacy evaluated in the expectation that a single most appropriate measure can be evolved by successive modifications. As a first step it might be pertinent to consider employment as a yardstick, mainly because of its common use as a measuring unit in existing base studies.

There are certain technical difficulties connected with the use of employment, such as the problem of adjusting for part-time and seasonal workers. In addition, however, there are at least two conceptual shortcomings of employment which render it unsuitable as a measure of the export earnings of any particular industrial activity. First, it ignores interindustry differentials in wage rates, and second, it does not take into account the earnings of factors of production other than labor.

The first of these fundamental difficulties, and most of the technical problems as well, can be dispensed with quite readily by using payrolls rather than employment. The problem of non-labor earnings, however, still remains.

At this point total export sales might appear to be a likely alternative, since such a comprehensive measure would obviously include all earnings from trade with the rest of the world. But the very comprehensiveness of this measure is a disadvantage in that it also includes the value of purchased raw materials. By subtracting the value of these inputs from total export sales, a more pertinent measure of export earnings can be obtained, namely, value added by manufacture of goods and services sold outside the area.

Although this almost fits the requirements of an appropriate unit under the stated definition of the urban economic base, one additional and very fundamental adjustment is still necessary. The nature of this adjustment perhaps can be most easily seen by way of the following digression.

Suppose there is an area which has two canneries producing canned foods all of which are sold outside the area. Further, suppose that the first cannery prints its own labels, while the second purchases them from a local printer. For the sake of simplicity, it will be assumed that the printer sells all of his output to the second cannery. It seems fair to assert that the employees of the print shop are just as much export employees as the workers in the label shop of the first cannery.

[1] Richard B. Andrews, "Mechanics of the Urban Economic Base: The Problem of Base Measurement," *Land Economics*, February 1954, p. 52.

Thus, in order to arrive at a fully adequate measure of the economic base, it is necessary to stop thinking rigidly in terms of the Standard Industrial Classification and to start thinking in terms of total production processes which may be thought of as different lines of export activity. In the example posed above, instead of regarding canned foods as an export industry, a more accurate picture can be obtained by thinking of the production of canned foods as an export or, in other words, a basic activity. To measure the contribution of this activity to the base, value added in the manufacture of labels in the print shop should be combined with value added in the manufacture of exported canned foods in both canneries. Similarly, if the print shop happened to purchase its paper stock locally, the value added in its manufacture should also be included. There is no intention to imply a necessity for tracing each production process back to the last paper clip, but within the limits of the resources available for a base study, some adjustment for local purchases of raw materials by exporting firms should be attempted.

The sum of the value added in each of the various stages of production will account for all of the earnings arising from each particular basic activity. This measure, which might be designated "value added in the area," conforms uniquely to the definition of the urban economic base stated above. Without an adjustment for local purchases of raw materials by direct exporting firms, the quantitative contribution of any activity to the base would depend upon the extent of vertical integration in the area. Moreover, even if the economic base were defined as the creation of job opportunities by way of export sales (so as to make employment rather than "value added in the area" the appropriate measuring unit), there would still be the need to adjust for vertical integration.

Also, while "value added in the area" would provide what seems to be an entirely adequate measure of the size of the base and its components, other measures, such as employment and payrolls, can provide valuable subsidiary information about the qualitative nature of the base. For example, it would be extremely useful to know the distribution of the base earnings in terms of wages and salaries, profits, and capital consumption allowances in analyzing the generation of final demand within the area. In addition, the proportion of base earnings accounted for by firms making direct export sales as opposed to local raw material suppliers might be relevant to an evaluation of the speed with which an area might react to cyclical changes.

At this point the reader might be somewhat dubious as to the availability of information needed to implement the measurement of the economic base by means of "value added in the area." Undoubtedly, a good deal of effort might be required, but probably not as much as might appear at first glance. This relatively hopeful attitude rests on the contention that no adequate base study can be made without interviewing, at least on a sample basis, the bulk of the firms in the area. It is not sufficient to assume that manufacturing in general is an export activity, while retail trade, for example, serves only the local area. The empirical findings in *A Base Study of Madison, Wisconsin*[2] show that the distribution of total employment by major industrial group bears at best only a fair resemblance to the distribution of export employment as determined by field interview. The sad truth seems to be that the only way to determine which firms engage in exporting and to what extent they do so is simply to ask them.

While localization coefficients could provide a much easier solution to the problem of estimating the basic-non basic (export-local) distribution of each activity, such estimates would rest on two rather limiting assumptions: (1) that the Standard Industrial Classification represents homogeneous product groupings, and (2) that purchasers choose sellers solely on the basis of transport cost minimization.

Given the necessity for widespread interviewing, the determination of "value added in the area" as opposed to, say, export employment merely involves asking a few additional questions. Specifically, in addition to asking: (1) What are your total sales and what proportion of your sales are made outside the area? and (2) What is your average total employment? It would be necessary to ask: (3) Which raw materials do you purchase in the area, what is their value, and from whom do you purchase them? This last question might involve additional interviews. Conceivably it might be possible to circumvent some of this secondary interviewing by making estimates based on input-output coefficients. Here again, however,

[2] John W. Alexander, *An Economic Base Study of Madison, Wisconsin*, Madison: Wisconsin Commerce Papers, Vol. I. No. 4, 1953, p. 19.

such estimates would depend on an assumption of transport cost minimization. Moreover, many of the firms involved might be interviewed anyway as potential direct exporters.

Finally, a few comments might be in order regarding the interpretation of the size of the total urban economic base, i.e., the aggregate "value added in the area" for all export activities. First, some account should be taken of *unearned* exchange credit, namely transfer payments. Government transfer payments into the area for the most part are obtainable from secondary sources, and at least a rough estimate of tax payments to nonlocal government can be made.[3] A second necessary step preliminary to an appraisal of the absolute size of the base is an adjustment for the difference between interest and dividend payments (1) by area firms to individuals outside the area, and (2) by firms outside the area to individuals within the area. Direct information pertinent to this adjustment in most cases is practically unobtainable. Fortunately these items tend to offset each other.

Even when the base has been adjusted for transfer payments and interest and dividend receipts, its absolute size must be interpreted in relation to the amount of nonbasic activity, as measured in comparable units. For example, a large amount of basic activity in relation to an area's population might merely reflect a low level of development of local activities.[4] If economic base studies were readily available, many regional promotion agencies might discover that some of their efforts directed at attracting export industries might be more profitably directed at the establishment of local industries or raw material producers for existing exporters. Also many of the salutary effects of diversification with regard to the area's vulnerability to cyclical changes might be just as efficiently obtained through raising the nonbasic-basic ratio. These last comments are not advanced as foregone conclusions, but rather are meant to suggest some fruitful avenues of investigation which could be opened up by the advancement of urban economic base studies.

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[3] Sales to local establishments of nonlocal governments could be treated as export sales.

[4] For a more complete discussion of suggested further research on basic-nonbasic ratios, see John W. Alexander, *op. cit.*, pp. 92-93; and John W. Alexander, "The Basic-Nonbasic Concept of Urban Economic Functions," *Economic Geography*, July 1954, p. 246.

Special Events Section: Milestones

This year, 1954, marks the thirtieth year of continuous publication of this magazine. It is also the one-hundredth anniversary of the birth of its founder, Richard T. Ely. Both events are milestones in the biographical life of this publication, which now occupies a unique place in libraries of research organizations, universities, government agencies, municipal planning groups, and private and public utility corporations and commissions. Its readers are scattered throughout much of the world: its significance is now on the international level, and it has made substantial contributions to the study of our policies in the fields within its areas of interest.

Originally given the title, *The Journal of Land & Public Utility Economics*, the magazine's name was changed in 1948 to *Land Economics*, a quarterly journal of Planning, Housing & Public Utilities. The purpose of this change, made after long discussions and painstaking efforts to poll the critics, was to find a shorter, perhaps less awkward, and at the same equally meaningful title. The articles below, both written by long-time colleagues and associates of the founder of the magazine, will illumine the reader's understanding of the aims and purposes of both the publication and its founder.—Editor

The Union of Land and Public Utility Economics

By EDWARD W. MOREHOUSE*

The author of this article has been associated with this magazine since its inception in 1925. He was its managing editor from 1925 to 1932 and has been associated with its board of editors since 1934. His professional life, combining as it does experience in the academic world as well as government service and service in the business world of private enterprise, fits him eminently to discuss the union of land and publicy utility economics in the area of interest of this Journal.—Editor

IN looking forward to the next thirty years it is frequently useful to keep our bearings by a backcast over the past thirty years. Thirty years are often considered roughly the span of a generation; so in effect I am suggesting consideration of a future generation's prospect against the background of the past generation's experience. One of the peaks standing out in this backcast was the bracketing of land and public utility economics as two special areas of economics that were coordinate and related, had some common features, and were capable, through the pages of this Journal and the research activities of the Institute for Research in Land Economics and Public Utilities, of being fruitfully and usefully developed together. It is my intention in this brief note to examine that union in the past—its whys and wherefores—and to comment on the importance of the union for the future: a forward look not only in keeping with the State's motto but also with the spirit that animated the group of people who sparked the birth of this publication thirty years ago.

A generation ago, when this Journal was launched as *The Journal of Land & Public*

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Utility Economics, many curious people asked about the union of these two fields, seemingly unrelated, at least when superficially considered. An explanation in terms of the Institute's slogan—"Under all, the Land"—would not do; for land popularly considered, underlay all human activities, economic or otherwise. A more plausible and satisfying explanation was to point out that as a practical matter land could not be effectively used for urban purposes without the utility services of water supply, sewage disposal, electricity and/or gas, transportation, and for many people telephonic communication. These needs for utility services in the case of urban land uses, except the need for transportation, did not apply, in equal degree at least to other land uses, such as growing trees, food crops, grazing, mineral extraction, or even recreation. Hence, this practical explanation, though concededly important, did not always fully satisfy. Another practical consideration was the dearth of factual material of economic import for utility operations (as distinguished from material of political import), which nearly matched the similar dearth of material concerning land uses, especially urban land uses.

Analysis will disclose, I think, at least four lineal ancestors of this union. These may be identified, for convenience, as historical, semantic, institutional, and pragmatic (already suggested).

Historically, the earliest lineal ancestor of this union is, I believe, the school of German historical economists, particularly Professor Karl Knies, under whom Professor Ely studied at the University of Heidelberg.[1] From this source came Dr Ely's initial interest in landed property as an influence upon the distribution of wealth. Considering land and land rights in their broadest senses led inevitably into water and water power and the energy minerals in the land.

Semantically, the concept "land" was early interpreted to embrace broadly all natural resources connected with land, whether above, below or on the surface. Thus air, sub-surface minerals, and the utilization of them, have been considered includible within the scope of "land economics."[2]

The institutional ancestors of this union may be considered to fall into two groups: (1) the interest of those early Institute associates in economic institutions as such in their influence on human relations; and (2) the particular organization banding together those interested in pursuing research along these lines. As to the first, reference has already been made to Professor Ely's monumental treatise on *Property and Contract*, two basic institutions whose economic influences have developed and ramified to an amazing degree. In addition, from the standpoint of public utility economics, reference should also be made to Professor Glaeser's *Outlines of Public Utility Economics*,[3] whose "going concern" approach to public utility problems has been strikingly from the institutional economics standpoint.

As to the second, the best evidence is the words of the founder of the Institute for Research in Land Economics, which added "& Public Utilities" in 1923, about the time the writer of this note became associated with the enterprise. "Parallel with the land studies, the Institute has undertaken a comprehensive and far-reaching program of research in public utility economics. Why public utilities should be associated with land in the Institute's research work is not difficult to understand. In the case of urban land, all the problems of city development are related more or less closely to transportation. In the case of agricultural land, the marketing of farm products is of great importance. Such a public utility as water power cannot be considered except in connection with the land. These relationships, we may expect, will become increasingly vital to public welfare as our economic society grows more complex and its members more interdependent."[4]

[1] Richard T. Ely, *Ground Under Our Feet* (New York: The MacMillan Co., 1938), pp. 41 ff.; Richard T. Ely, *Property and Contract* (New York: The MacMillan Co., 1914), p. ix, esp. Ch. X, XI, VI, VII and others.

[2] See Richard T. Ely, "Urban Land Economics," *Institute for Research in Land Economics* (Ann Arbor, Michigan: Edwards Brothers, 1922), (mimeographed); Richard T. Ely & Edward W. Morehouse, *Elements of Land Economics* (New York: The MacMillan Co., 1924), p. xii and 12; Richard T. Ely and George S. Wehrwein, *Land Economics* (Ann Arbor, Michigan, Edwards Brothers, 1928), pp. 4-5, 7-8; Ely and Wehrwein, *Land Economics* (New York: The MacMillan Co., 1940), esp. Chapters II-IV, where land is considered as "Nature," "Space," and "Property."

[3] Martin G. Glaeser, *Outlines of Public Utility Economics* (New York: The MacMillan Co., 1927). See also John R. Commons, *Institutional Economics* (New York: The MacMillan Co., 1934); and *Legal Foundations of Capitalism* (New York: The MacMillan Co., 1924).

[4] Ely, *Ground Under Our Feet*, *op. cit.*, pp. 237-8.

As to the pragmatic or utilitarian ancestors of this union, there may be added to what has already been suggested from this standpoint three observations which are often overlooked:

(1) Electric power service, for example, is upon analysis only a combination of different natural elements or forces, apart from the human element involved in making the combination and providing the service. In the case of hydro-electric power, falling water and the force of gravity are harnessed to mineral resources which upon extraction, transportation, and fabrication enter as ingredients into dams, generating equipment and the transmission and distribution facilities—all these are included in the concept of land broadly and flexibly conceived. In the case of steam-electric plants, in addition to the minerals entering into fabricated equipment or housing structures for the power-generating equipment, we need coal, oil, or gas as fuel, and water for steam and cooling, as well as air for combustion. Indeed, when one stops to analyze electrical energy and how it is made, it becomes basically a particular arrangement of materials and forces of nature, all of which are comprehended in the economic concept of "land."

(2) Considering land as "space" or "property," we find public utilities have a compelling need for land and land rights, not only as source materials, but also as sites for their facilities to enable service to the public. So important to public welfare are these services of public utilities that almost universally public utilities are granted by statute the power of eminent domain to make sure they get needed land or land rights. In fact, the possession of this power is often regarded as a distinguishing characteristic setting off public utilities apart from other industries not serving general public interests to such a high degree.

(3) Appreciable costs have to be incurred for making available public utility services to an urban lot or a farm simply to make the land usable under modern conditions. Such costs have to be incurred regardless of the costs of operating or taking the public utility service once use of the land has begun. It used to be said that the costs incurred by a subdivision land developer to bring utility services (water, sewer, electricity, gas and perhaps telephone) to the residential lots he hoped to sell amounted to from 30% to 40% or more of the first cost of the land; now this ratio is probably nearer 50%. Such figures omitted, usually, the costs to the utility enterprise of extending its service to the community or to the lot-line or farm-yard distribution pole. These may be equivalent to or even exceed, on a per customer basis, the costs to the land developer or the land owner when he adds the costs of bringing utility service from the lot-line to point of use in the premises. All such costs, broadly considered, are part of the costs of developing land use, from the utilitarian or pragmatic standpoint.

Looking around us now and to the future, what can be said briefly about the importance or significance of this union of land and public utility economics? In my view there is and will be growing interest in this subject. Population grows apace, the world over. Intensive and extensive uses of land similarly grow by leaps and bounds. Needs and demands for electric power as an energy resource, to cite only one utility service deemed vital to capitalistic or industrial economies, are growing so rapidly both in total and per capita as to raise misgivings about the adequacy of our fossil energy sources,[5] and to encourage development of atomic energy—another natural resource includible in the concept "land."

Electric public utilities, for example, are finding land in its economic sense an increasingly limiting and costly factor in their operations. Undeveloped water powers are increasingly costly and uneconomic to develop. Sites for generating plants, with suitable large supplies of cooling water, are becoming more difficult to find and costly to develop to meet ever-growing public demands for electric energy. Rights of way for transmission and distribution lines and substation sites are also becoming ever more difficult to arrange for and costly to acquire. Costs of exploration and exploitation of gas and oil are rising.

Another aspect of the importance of this union is found where, for illustration, certain transportation developments and problems are considered in relation to land uses. Expenditures from tax revenues derived from various sources for street and highway facilities to accommodate road transport now are a major, if not the largest, item in state and local community budgets. The President of the United States has recently proposed a

[5] The President's Materials Policy Commission (Paley Commission), *Resources for Freedom* (Washington: U. S. Government Printing Office, 1952).

10-year $50 billion highway development program. The plight of urban community mass transit agencies, privately- or governmentally-owned, is notorious. The huge expenditures for community street and express highways to relieve congestion resulting from the enormous boom in automobiles and truck use are almost daily before the public. In the larger areas, motor transportation, whether of passengers or goods, whether on the surface or in the air, has so multiplied in use and facilities for use that the economics of industrial location (including decentralization of industry), carrying with it resulting effects on population movements and residential and commercial locations and uses, has become revolutionized. This in turn has created new problems, or raised old problems to a new level of significance, in such land uses, for illustration, or public control thereof, as airports, shopping centers, bus and air terminals, zoning and land planning. Transportation economics, in short, like the economics of electric, gas and other utilities, has entered a period of revolutionary change.

In brief, public utilities today face a future of growing scarcity and costliness of natural resources (land as space, water resources, fossil mineral fuels) such that there is growing need and effort to find new sources of energy (nuclear fuels and even solar energy) to meet the ever-growing total and per capita energy requirements and new solutions for transportation and related problems. These form essential tools for continuous advances in the economic well-being of a rapidly growing population.

In summary, the union of land and public utility economics was not only justified but prescient in the past, and is becoming even more imperative for future advances in progressive well-being of individuals the world over.

Richard T. Ely in Retrospect

By DON D. LESCOHIER*

The author of this article came to the University of Wisconsin in 1907 as a graduate student and studied under Richard T. Ely, the founder of this Journal, throughout his student days and was associated with him as a faculty colleague thereafter. He discusses here the personal characteristics and career, as he saw it, of this man whose fertile brain conceived the need for and possibilities of a magazine devoted to land problems in the broadest sense of the term.—Editor.

"UNDER ALL THE LAND," the slogan coined by Richard T. Ely and his associates in the Institute for Research in Land Economics and Public Utilities, was not just a cliche. It was a fundamental concept upon which the whole structure of land economics and sound national and local land policies rested. Until one understands this, he cannot correctly evaluate Ely's approach to land problems, rural and urban.

The evolution of Ely's interests and social ideals began much earlier than with the beginning of his professional career. He came of a family of strict Scotch Presbyterians. He was reared in an atmosphere of close contact with both farm and small-city urban life. While he found the Episcopal church more fitted to his temperament, deep and controlling religious convictions remained one of the basic influences determining his attitudes toward the land and other economic situations which attracted his attention. Always a higher degree of social welfare was his major objective.

The scope of his interests, even in those early days when, as a student, I participated in a seminar taught jointly by Ely, Henry C. Taylor and Thomas S. Adams, was patently evident. He was probing into such land problems as rent, tenancy, land use, taxation, the use of public land by municipal utilities, and conservation. Prior to 1907 he had written books on French and German socialism, American socialism, the labor movement, social aspects of religion, the complex needs of American cities, natural monopolies, and an elementary text on economic theory as well as a study of industrial evolution. In a book on economic problems he included discussions on tariffs, monopolies and taxation problems. The direction of his interest was always toward developments in all these economic areas designed to further the public's interests.

In 1938, when over seventy-five years of age, Ely wrote: "In the year 1885 Adams, Clark, Patten, James, Seligman and I—fresh from our studies in Germany—were regarded as a group of young rebels. We young men were deeply conscious of the fact that we were human beings as well as economists and that we were engaged in the task of furthering a science which is first and foremost a science of human relationships." It was not by accident that Ely drew the comment from John R. Everett that he was "the acknowledged standard-bearer for the American school of ethical economists."

When I studied under him, in 1907 to 1909, Ely had not fully developed his consciousness of the fundamental significance of land. But when I joined the economics faculty of the University of Wisconsin in 1918, Ely was emphasizing the land as an integral part of economic problems in general.

In 1907 he had been deeply concerned about the differences of opinion between John Bates Clark and himself concerning whether land should be considered a separate economic category or merely as a form of capital: whether the rent of land differed essentially in nature from interest on capital. He saw that this theoretical problem had deep significance in connection with such areas as taxation and public policy. But his analyses were leading him toward the wider problems of national land policy, conservation, improvement of farm methods, and more equitable distribution of the income from agriculture. I remember well his challenge to me as a student: "Lescohier, the economic problem of the future is the distribution of wealth. We have mastered production but we don't know how to distribute economic income for the greatest social welfare!"

It is not to be expected that he could have foreseen in 1908 the unprecedented advances in production, both urban and rural, that would come in the years ahead; but he was certainly right in his emphasis upon the

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importance of distribution. Now, in 1954, it is still one of the most crucial of our economic and political problems—one which may not be solved so much by theory as by social pressures.

During the 1880's and early 1890's Ely was profoundly stirred by his experience in the Chautauqua movement, in which he taught for seven summers. "It was largely through Chautauqua," he wrote in 1938, "that I was able to exercise my greatest influence." He described how it brought together "the people" to listen to the great thinkers of the time—"men in their shirtsleeves, others in their Sunday best, all listen quietly, intently, their upturned faces revealing their emotions." "No where else could they, farmers and laborers, get the solid mental food they were being fed so liberally here." Rethinking those seven years, he said in his autobiography: "I was not a popular lecturer—if, as many believe, I had a message, I had to convey it to the world through my writings and my students, rather than through my lectures."

This conviction that his pen was to be his major means of communication dominated his activities through the remainder of his life. Through his writings, he reached out to the national audience; but through his students he sent forth disciples to spread his convictions in classrooms, legislative halls, the business world, rural groups, churches and other forms of social activity.

It is true that he was not an orator. He did not have an impressive voice and he often spoke in a monotone. For people who heard him but once, or on a few occasions, he doubtless failed to register as forcefully as many of the famous men and women who addressed Chatauqua audiences. But in the classroom, speaking to smaller groups and giving semester courses, it was a different matter. He had certain characteristics that made him effective. First, he was systematic. His course was carefully planned and he carried out his plan. Therefore, he covered a substantial amount of subject matter. Second, he was thorough. He drilled into his students a body of facts, principles, and social ideals. He did not fear to repeat. He was never in a hurry. He did not go off on tangents. One had a chance to assimilate what he had said, to ask questions, to carry on discussions with him. Third, sincerity and idealism ran through all his teaching. Today, nearly fifty years after I sat at his feet, I probably remember as many of Ely's observations as of any teacher I ever had, in spite of the fact that most of my professional life has been concentrated on labor relations rather than upon land problems.

These are a few of the personal highlights of the man who founded *Land Economics*, and was one of the dynamic group who during the first half of the twentieth century aroused in America a consciousness that our country's handling of our land resources and land policies was in many respects suicidal and in most respects deficient.

Book Reviews

Nonwhite Housing in Wisconsin. By Governor's Commission on Human Rights: Madison, Wisconsin, 1954, pp. 94.

This report by the Governor's Commission on Human Rights on the current housing situation among Wisconsin's nonwhite population is based on separate studies of five cities: Madison, Racine, Kenosha, Beloit, and Milwaukee. The report is timely in that the 1954 federal housing program specifically considers housing for nonwhites.

The Governor's Commission was assisted in the study by an unusual group that included men in finance, real estate, planning, social work and government, as well as housing experts and interested citizens. Members of the Real Estate Boards and the Association of Real Estate Brokers were instrumental in carrying out the survey.

Part 1 of the report presents the results of the fact-finding groups. The material was obtained from census data, field studies and brief studies of individual cases. The survey for each city is illustrated by a scatter map showing by wards in Milwaukee, by census tracts, the location and concentration of nonwhite families. The analysis pays particular attention to economic status, housing conditions and rehabilitation problems. The economic level of nonwhite families has risen; increasingly they are home owners and home builders. To date, however, their needs have not been adequately met. Some of the general problems confronting nonwhite families, such as decent housing, greater income, more educational opportunities, combatting prejudices, the need for integration, etc., are analyzed. These problems are not peculiar to the cities of Wisconsin, but arise in many localities. A comprehensive analysis of the housing of the nonwhite population is required for all parts of the country, particularly since our housing needs and standards of living have changed in the last decade.

Part 11 of the report sums up the points of view of realtor, builders, lenders and the community at large on housing for nonwhites. The general attitude of these groups is constructive and is directed toward getting nonwhites housed in decent houses.

This report might profitably be used as a pattern for other cities and communities in studying their nonwhite housing problem. Too often unfounded generalizations are made in this area, without sufficient information to support the assumptions or statements.

GORDON D. MACDONALD

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The Frontiers of Economic Knowledge. By Arthur F. Burns. Princeton: National Bureau of Economic Research and Princeton University Press, 1954. pp. ix plus 367. $5.00.

Professor Burns' appointment as Chairman of the President's Council of Economic Advisers stimulated interest in this economist and his work. Publication of the present collection of sixteen essays by the National Bureau of Economic Research is exceptionally timely.

The sixteen essays are divided into two groups of eight each. The first group is composed of annual reports on the National Bureau, its work, and the implications of its work, presented by Burns as the Bureau's Director of Research (1945-53). The second group is composed of other essays and review articles published over a sixteen-year period (1935-51). None of these items is unavailable in its original form, but it is convenient to see them assembled here. Taken together, they give a coherent mental picture of our current Chief Economic Justice.

The leading impression left in this reviewer's mind is less an impression of an economist and social philosopher than of a faithful disciple and apostle. A preface to Wesley Mitchell's last book on business cycles and a laudatory biographical essay on

Mitchell are included; there are twenty-four references to Mitchell in the index. Mitchell is, if not God, a Man Who Can Do No Wrong, and Burns is satisfied to be his prophet.

Fortunately the doctrine of Wesley Mitchell is civilized and urbane, and in this respect Burns strives to follow his master. His economic method is Mitchell's statistical institutionalism, meaning statistical research directed primarily at topics which interest researchers, secondarily at topics relevant to public policy, and only lastly at testing the theories of others. The National Bureau is Mitchell's (and Burns') monument. It has been derided as a "figure factory," and its results as "Knowledge for What?" But in the aggregate, the work of Mitchell, Kuznets, Mills, Fabricant, and Burns (to sample the Bureau's roster of great names), has been not only ample enough but useful enough to silence the critics. Few if any regret the existence of a major research agency organized along National Bureau lines and devoted to National Bureau methods. And Burns for his part nowhere seeks a monopoly of research opportunity, or decries agencies organized along other lines and using other methods.

The report for 1951, entitled *Looking Forward*, shows Burns as a holder of middle-of-the-road views on public policy, clearly amenable to the moderate conservatism of the present Administration. Burns is revealed as an optimist regarding many aspects of the American economy. "We may be said to have traveled in a bare two decades over half the distance separating the 1929 distribution from a perfectly egalitarian distribution." "The great contrast between the German experience" in wartime labor force expansion "and that of the democracies has many causes, but perhaps the most important is that a free and peaceful people have a resilience and energy at a time of crisis that cannot be matched by a dictatorial state." Burns calls for increases in the rate of growth of labor productivity, but at the same time for reconciliation to a substantial and permanent increase in the economic role of the Government. Economic stagnationism is anathema to him, but so is the "new era" notion that we have triumphed over his own specialty, the business cycle. Burns grants short-run validity to the "exhilaration thesis" of stair-step inflation, but "if the price inflation of recent years extends into the next decade, the clock of policy may eventually turn back to the 1920's, when the primary emphasis was on a dollar of stable purchasing power."

As Keynesianism (maturity and stagnation) was economic gospel to the later New Deal, so anti-Keynesianism (onward and upward) is gospel to the Eisenhower Administration. Burns is an anti-Keynesian of long standing, and *persona grata*. At times he even falls short of the Mitchell standard of sweet reasonableness in attacks on Keynesian doctrines, of which this volume includes four (if we include a review article on Hicks' *Trade Cycle*). It is difficult to estimate Burns' overall batting average in this controversy, particularly since his refutation of an adversary in one formal interchange (Alvin H. Hansen) is presented without the adversary's original argument. Burns repeatedly makes, it appears, two major points against the Keynesians: (1) The behavior of the Keynesian "aggregates" depends significantly on their composition, but Keynesians pay no attention to their composition. (2) Keynesians have been too bold in reducing the number of variables in their equations, making them elegant but not realistic. (The consumption function, in forms relating consumption as an aggregate to income as an aggregate, and to nothing else, is a good example on both counts). The common or garden variety of Keynesian at all times, and thinkers like Keynes in unguarded moments, are easy victims of Burns' strictures, but he does not always follow the logical precept of attacking arguments in their strongest rather than in weaker forms.

Many readers will be surprised to note the grace and ease with which Burns the empiricist handles economic theory. He is clearly an institutionalist by choice and not by necessity. In the penultimate essay, on the Brookings Institution study of *America's Capacity to Produce*, he castigates that study's use of technical as against economic criteria of "capacity," i.e., for insufficient attention to the cost of expanding output all along the line under the conditions of the late 1920's. And in the final essay, "Long Cycles in Residential Construction," Burns develops what we now call an econometric model, and explores its implications in a manner twenty years ahead of its time (1935).

M. Bronfenbrenner
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The City Fights Back. By Hal Burton. Written for the Urban Land Institute. New York: The Citadel Press, 1954. pp. 209, appen. $5.00.

The Newsletter of the American Society of Planning Officials devotes a full column to a destructive review of this volume without pausing to describe the contents. The reviewer calls it "pap" and resents the "glib" solutions and "broad generalizations." He can't understand why the Urban Land Institute "let something like this loose on the public." This diatribe in the planning sheet is mentioned because I so completely disagree with its implications.

First, the book makes no pretense of more than a popular presentation of contemporary urban problems with examples of solutions from real life. The volume is founded on the sound premise that the central business district will long continue to be the nerve-center of the city and an essential functional component of the community organism. It is not a scientific treatise nor does it aspire to be such; it exudes a faith that the problems of cities are soluble in contrast to the alarmist journalism which often taints the outpourings from the prophets of the planners; it demonstrates that determined and enthusiastic men can find ways to reach or to approach community goals over seemingly impossible obstacles.

The subject matter of the volume is limited largely to problems of the central business district. The scheme of each of the 18 short chapters is to outline a type of problem and then to cite examples of how it has been successfully attacked in one or two cities. They are familiar problems—suburban growth, parking, traffic congestion, mass transit, smoke, noise, blight, retail decentralization, and allied headaches. The solutions are not alleged to be universally applicable but there is inspiration for all in the story of the reclaiming of the Golden Triangle in Pittsburg, in the Indianapolis program of redevelopment, in the recounting of real advances made toward adequate parking, and in Allentown's valiant and successful rebuff to the forces of retail decentralization in its "Park and Shop" plan.

The appendix contains such items as sample reports by the Central Business District Council of the Urban Land Institute on the Dock Street Area of Philadelphia and on traffic and parking in Seattle. A copy of the Indianapolis Redevelopment Act of 1945 is presented, two items on smoke abatement, an interesting table comparing the relative growth in net sales of parent stores and branches, a number of statements relating to the Philadelphia payroll tax, noise abatement, the Cleveland Real Property Inventory and some general conclusions on central area problems.

It seems to me that *The City Fights Back* provides a perspective on central district problems which is badly needed by public agencies and citizens' groups who are groping for a handhold. For the social scientist it provides a series of case studies in adaptations of the city as an institution to changing economic, social and technological forces. For the down-to-earth planner, it gives evidence that men can find the ways and means for reaching goals which are sound in conception and sufficiently motivated. For the embittered or hypersophisticated planner, it is quixotic and old hat. Don't read it.

RICHARD U. RATCLIFF

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Origin of the Land Tenure System in the United States. By Marshall Harris. Ames, Iowa: The Iowa State College Press, 1953. pp. 445. including bibliography and three indexes. $7.50.

This book is a scholarly account of the development of land tenure concepts in the United States. Historically, it covers the period beginning with English feudal tenures and ending about 1800, by which time the major principles of our tenure system were established. Dr. Harris begins with a brief chapter on the nature of land tenure and devotes the first 150 pages to descriptions of feudal antecedents, territorial claims in the New World, colonial grants and charters, and the tenure systems of each of the 13 colonies. The next 150 pages deal more with functions than with geography, and treat the acquisition of land from Indians, the headright system, disposition of land by sale, special purpose grants to settlers, the New England town system, and land companies. The last 100 pages describe the emergence of the national land system, certain forces that in-

fluenced the evolution of land tenure in this country, and the antecedents of our public land policies.

This definitive work is the product of years of painstaking research and attention to detail. Most of the objective data have come from original sources, and the documentation is complete and precise. The author has provided an impressive bibliography, as well as three useful indexes—biographical, geographic, and subject—and there are 11 maps showing territorial grants of the original colonies. It is safe to predict that this book will be accepted by the profession as a fully developed and authoritative source of information and a significant addition to the literature on land tenure.

It should not detract from Dr. Harris' work, however, to observe that certain limitations have been imposed both by the subject matter and by the method employed. Dealing in considerable detail with many aspects of land tenure, the author has been obliged to omit others of some importance. This study, for instance, contains little or nothing on water rights, mineral rights, and survey systems. It deals exhaustively with the English antecedents of our tenure system but says practically nothing about adaptations from Spanish and French institutions. The author discusses legal concepts fully, but provides none of the maps or descriptions of (for instance) typical New England settlements or Middle Atlantic manorial estates that might give the concepts more specific meaning. The economic and political framework within which land tenure institutions have developed is treated rather sketchily. This is not to say that Dr. Harris could have done otherwise in the space at his disposal but only to point out that he has been able to develop only part of the picture.

It might also be observed that a carefully detailed description does not lend itself to easy generalization. This is particularly true in a conceptual analysis without quantitative measures by which to judge relative values and emphases. It is important to know that there are few new ideas about land tenure that have not already appeared in earlier times and other places, but that fact by itself tends to obscure rather than to emphasize historical and regional variations in institutional patterns. This reviewer has the utmost respect for Dr. Harris' meticulous research but is particularly grateful for the short interpretive summaries at the end of several chapters.

G. W. Loomer
University of Wisconsin

Towards New Towns for America. By Clarence S. Stein. Liverpool: The University Press of Liverpool, 1953. pp. 245, $5.00 (Agents for the Western Hemispheres Public Administration Service, Chicago, Illinois.)

This is an important book for urban land economists. Clarence Stein, one of the pioneers of land planning in the United States, here presents a series of studies which provide an eloquent and entertaining account of the development of some of the more interesting and original planning experiments carried out in this country in the past 25 years. Since Stein was associated in one capacity or another with most of the projects he discusses in this volume, as much emphasis is placed on the philosophy underlying the planning as on the actual physical processes involved.

Chronologically, Stein's studies stretch from 1924 to 1941; geographically from Sunnyside Gardens in New York to Baldwin Hills Village in Los Angeles. In the interim period (and area) Radburn, New Jersey; Chatam Village, Pennsylvania; Greenbelt, Maryland; and Phipps Garden Apartments, Hillside and Valley Stream, New York were all completed. Each of the developments is used to illustrate factors which Stein believes are important for the future of new towns in America and to support his opinions on such controversial subjects as renting versus home-ownership, low versus high apartments and cooperative versus private control of business enterprise. In all the above cases Stein favors the first mentioned of each alternative. These controversial points, however, are only on the periphery of Stein's major proposition that new towns in America will be developed only through a combined use of the Garden City, the Radburn Idea, and the Neighborhood Unit concepts. The evolution and development of these ideas in the United States are demonstrated by the projects which Stein specifically discusses in this book.

As might be expected, Radburn, New Jersey, Greenbelt, Maryland and Baldwin Hills Village, California are studied most completely. In each case Stein traces the

origin of the plans for the projects, the difficulties involved in their conception and development and their present position. Since he is an architect by profession, he gives considerable stress to planning and construction, but not at the neglect of the social and management problems. He makes personal surveys of occupants' attitudes towards everything from size of laundries to municipal government and, while one might prefer more scientific methods of sampling, the results are very interesting. Without doubt this is the best available collection of essays on the development of new towns in America.

Although Stein might have provided more complete data on costs to the occupant and the relative cost of building a Radburn development as opposed to a conventional type, these are in reality minor matters. This book points out effectively what has been done. It is not visionary because it explains actuality and, since the ideas seem wise, it is disturbing that they have not been adopted on a broader scale. Although blight and slums are today considered major problems in the United States, areas are still developed in the same old pattern. We continue to build the slums of tomorrow by erecting subdivisions which are susceptible to blight before they are even occupied. Why should this be so?

Stein finds the answer in the entire framework of land development, finance and planning. He argues that, since in the past there have been fluctuations in real estate markets, builders are unwilling to risk their money in long-term operations and therefore are not interested in the future of developments, but only in quick sales. In addition, Stein argues that the lenders and the Federal Housing Administration, through their refusal to sponsor and support new ideas, contribute to keeping outmoded building methods. He is also particularly vitriolic in his comments on city planning which he believes "proceeds not by positive action, but by negation . . . it restricts and regulates . . . and results in monotonous similarity of use, height and coverage and outline of neighboring buildings . . . in fact, city planning [is] not helpful in creating cities [as] discussed in this volume, but is foreign in their objectives; these towns are hampered, not aided by its use . . ."

Stein comes to the conclusion, that "bluntly the distinction is between building for people or building for profit." But, if this is the case, it is equally blunt to state that new towns will not be built in the United States. Within the framework of our economic system profits are the most important force motivating change and development and, in most areas of endeavor, the profit system has produced great returns. More importantly, however, the distinction may be unreal. There is no evidence that private enterprise cannot develop new towns and communities on the basis of the Radburn Idea successfully and profitably. Indeed, Baldwin Hills is not in any respect a subsidized operation, but rather a privately-owned profitable development. The hope for new towns in America lies with planners demonstrating to bankers and builders that maximum profits will be developed in the long run through the use of these new ideas.

Equally important, the planner must recognize (as Stein does not) that for good or bad, "home-ownership" has become a basic desire on the part of most American citizens and that the co-operative movement has never taken root in the United States. Consequently, new towns must be planned within the limits imposed by the recognition of these two facts. When this is done, and a way for profitable operations is developed, America will start to have the new towns it so badly needs.

Without doubt, Stein points the way for major changes and improvements in American cities. He provides insight into many pressing economic and social problems. Consequently, this lucid, well illustrated handsomely printed book is essential reading for all interested in the problems of the city. Although provocative, and in certain places biased, it is never dull.

JAMES GILLIES

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Gulf to Rockies. By Richard C. Overton. Austin: University of Texas Press, 1953. pp. xiii, 410. $5.00.

American railway history has been the subject matter of an abundant literature of which a very large part has been romantic and nostalgic rather than scholarly. On occasion, a scholarly work has appeared. But only very infrequently has a study combining both excellent scholarship and a fine literary style been written in this field.

Professor Overton's latest book, *Gulf to Rockies*, deserves to be placed in this exclusive category.

The history of the development of the Fort Worth to Denver railway route as part of a through route from the Gulf to the Rockies is recounted chronologically from the inception of the idea to the formation of the Colorado and Southern in 1898. The plan was originally conceived and sponsored by Governor John Evans of Colorado to free that state from dependence upon the transcontinental roads. By constructing the Denver and New Orleans railroad south from Denver toward Fort Worth, Evans hoped to establish a new cheaper route by which Colorado's products could be moved to eastern markets and its needs could be supplied. General Grenville Dodge, ablest of the nineteenth century railroad builders, at the same time determined to build north from Fort Worth toward Denver. These two men cooperated in guiding policy through subsequent years as the railways were constructed from 1881 to 1888, when the through route including a few miles of leased trackage rights was completed.

Because some traffic originating and some terminating on the Union Pacific was essential for the success of the Gulf to Rockies route, Dodge, a member of the Union Pacific directorate, attempted to keep a harmonious arrangement between the roads. However, an agreement between them which terminated a period of unsatisfactory warfare was abused by the Union Pacific; and this, combined with years of crop failures in the Panhandle, forced the bankrupt roads of the Fort Worth-Denver route to seek their independence from the Union Pacific, a policy Evans had desired to pursue from the start. The strategic moves of Dodge in guiding the reorganization of the bankrupt properties into the Colorado and Southern were masterful feats of financial and legal diplomacy.

Both Dodge and Evans were constructive thinkers and planners. Dodge possessed the ability to choose and retain the loyalty of good railway men, and at the same time he moved readily and convincingly in eastern financial circles. He was frequently able to bring about solutions to problems which Evans, because of bitter battles with the transcontinental roads, was unable to resolve. Although the men had a common goal, success was largely the result of Dodge's ability to solve problems and get things done.

This volume—the first of Northwestern University's Studies in Business History—is a study of men, ideas, plans, successes and failures, all carefully analyzed against a background of relevant, contemporary economic history of the area. The author has culled much of his material from original sources, particularly from the correspondence of the principal men involved. His task was the more difficult because the records of the Fort Worth and Denver were destroyed by fire in 1898. By painstaking research the history has been interwoven from many fragments, and the story has been retold in a highly interesting and informative manner. The documentation is superb, the maps are adequate, and the book has been made somewhat more attractive by the inclusion of pen sketches by Reginald March, as well as by photographic illustrations, and an excellent performance by the publisher.

WILLIAM V. WILMOT, JR.

University of Wisconsin

The Rural-Urban Fringe: A Study of Adjustment to Residence Location. By Walter T. Martin. Eugene, Oregon: The University Press, 1953. v, 109 pp.

Professor Martin's paperbound monograph is the first in a series of studies in sociology being prepared and published at the University of Oregon. It adds a carefully reasoned and cautiously concluded contribution to the new respectably large but still discouragingly disorganized literature of the rural-urban fringe.

Before presenting his study hypothesis and detail of procedure Martin makes a valuable contribution to what might be termed the field of rural-urban fringe theory by means of an opening chapter called "The Fringe Area: Introduction and Inventory." In this chapter of only twelve and one half pages he presents an amply footnoted discussion of the principal literature of the field. This analytical review, however, is organized around the shortcomings of the literature such as "inadequate theoretical foundation," and "inadequate statement and treatment of hypotheses."

The questions to which the study is addressed are: How do families adjust to life in the fringe? What are the problems, the frustrations, and the satisfactions of fringe

residence location? What are the characteristics of those individuals highly favorable to fringe location as contrasted with those who yearn for urban residences? As the author emphasizes in his preface more questions are asked than are answered and even those answers which are obtained are far from conclusive.

Generalizations made in the concluding chapter in some cases remain no more than hypotheses subject to further testing but a substantial core of more strongly verified ideas leaves the reader with a definite sense of satisfaction. Martin makes one finding of direct importance to land economists. He states that "the extent of accessibility of the residence location to the city center may be important in individual cases, in general it is not a crucial factor in satisfaction with residence location in the fringe." But he agrees with Amos Hawley that "the familial unit must maintain a degree of accessibility to the principal centers of activity in the community."

Four appendices present the field sampling procedure employed, the procedure of estimating total population, technique of constructing the rural-urban residential preference scale, and the field schedule itself. The details of the schedule are most interesting in that, although the questions are not new, their arrangement and sequence conveys to the reader a sense of great scientific care in the process of preparation.

Professor Martin's study in the opinion of this reviewer is of importance to the field of land economics less for its specific hypotheses and conclusions than for the exemplary breadth of approach and meticulousness of technique that are so necessary to an ultimate organization and understanding of that chaotic conceptual field which is the rural-urban fringe.

RICHARD B. ANDREWS

University of Wisconsin

Transportation and the Growth of Cities. By Harlan Gilmore. Glencoe, Illinois: The Free Press, 1953. pp. 170, $3.00.

"It is the thesis of this book that community classification to be realistic must be done on a basis of a combination of economic and social functions. According to this thesis the functions which a specific community performs depend (1) on the type of economic and social system of which it is a part and (2) on the role it plays in the division of labor (functions) in that system . . . This is followed by a proposal of a set of hypotheses regarding the division of functions by communities in the several social systems . . . The framework on which this analysis is based in that of transportation systems." Pursuant to these objectives and assumptions the author devotes about half the volume to a compact history of the innovations in transportation and their development. He proceeds from the wheel, the cart, and the keel boat to the steamship, the canal, the railroad, and the automobile. The accompanying advances in speed and cheapness and certainty enabled cities to grow larger and to assume different functions because they could now rely upon a larger productive and marketing areas. As new transportation systems developed, cities, as a means of securing their livelihood, substituted for taxation and military force first a trinket trade economy in goods that could stand higher transportation costs and then a two-way "equal trade relationship" emphasizing a money economy. Crowding so much history into so small a space inevitably invites generalizations to which many nistorians will take exception and involves several errors which the pedants, with their preference for factual birdshot, will easily puncture.

The second half of the volume describes without much concreteness the various types of cities which transportation changes have created, discusses intra-urban transportation and its effects upon the localizations of functions within the city, and enumerates a list of urban-rural traditions which historical arrangements associated with the level of transportation development have created. To the traditions of rural-urban antagonism and of rural exploitation by the cities, Mr. Gilmore applies the favorite sociological smear words, "cultural lag." In my estimation such denunciation results from Gilmore's over-absorption with a single strand of development and from an exaggeration of the influence of that development. Though diesel locomotives and motor cars have done much, they have not obviated the need for taxes or abolished either the debtor-creditor relationship or the price system. A good

share of recent American history is incomprehensible, though we have had railroads for a century and automobiles for decades, unless we understand that rural discontent is based upon the low prices of wheat and cotton and the high price of land, textiles, and fertilizers. Just because the wheels go round does not mean that the bases for the "stereotypes" of city slicker and honest rube are no longer with us.

EDWARD C. KIRKLAND
Bowdoin College

"Tribute to Whom Tribute . . . . "

Elsewhere in this journal will be found words of tribute to the magazine and to its founder. Members of the Editorial Board and old associates have called attention to this year 1954 which marks the hundredth anniversary of the birth of the founder and also completes the thirtieth year of continuous publication of the magazine.

Still another milestone was reached during this year of 1954: the Cantwell Printing Company, an old and highly respected business firm, has for ten years carried the responsibility of getting the magazine into print. This has been done in a generous spirit of cooperation. Publication during the war years was accomplished in spite of the harassing problems of shortages in both quantity and quality of paper stock.

The Journal has been published by this same printing company during the earlier period of the 1930's. Then Richard T. Ely, its founder, negotiated the first contract with Mr. Joseph Sexton, the President of the Cantwell Printing Company. It was this earlier association that opened the door for cordial relations with Mr. Sexton when the magazine returned to the University of Wisconsin after seven years at Northwestern University. And we like to think also that he recognizes the contribution that the magazine is making to the sum of human knowledge in a field in which Wisconsin and its University has pioneered.

We pay this public tribute to the printer—to all employees in any way in the work of producing *Land Economics*, with special mention of Miss Emma Rice and Mr. Leo Morschauser.—MARY E. AMEND, *Managing Editor*

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a quarterly Journal of

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Overseas Agents for subscriptions £1.50 per annum and single copies (7s. 6d. each) Messrs. Staples Press Ltd., Mandeville Place, London W. 1.

Subscriptions to the Journal £1.50 per annum and enquiries re advertisement tariffs to the Secretary, P. O. Box 5316, Johannesburg.

JOURNAL OF FARM ECONOMICS

Published by The American Farm Economic Association

Editor: Lawrence W. Witt

Michigan State College, Lansing, Michigan

VOLUME XXXVI November 1954 NUMBER 4

This Journal, a quarterly, contains in addition, notes, reviews of books and articles, and a list of recent publications and is published in February, May, August, and November by the American Farm Economic Association. Yearly subscription, $5.00.

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